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ABSTRACT

This document contains 59 selected papers from the 1996 International Visual Literacy Association (IVLA) conference. Topics include: learning to think visually; information design via the Internet; a program for inner-city at-risk children; dubbing versus subtitling television programs; connecting advertisements and classroom reading through visual literacy; tools for humanizing visual symbols; a review of a video on advertising and obsession with thinness; hypermedia and the fundamentals of electronic literacy; elementary students' perceptions of visuals on the World Wide Web; stereotypes in film; teachers' perceptions of instructional design; visual learning activities; tri-coding of information; diversity in Cyborg images; concept mapping; the meaning of color in trademarks; visual literacy in elementary education; visual learning via computer-based simulations; adapting a paper-and-pencil test to the computer; representational strategies in a documentary about racial relations; studying scientific data through an aesthetic point of view; the role of the media in African American self-hatred; the need for visual literacy in higher education; imagery and synectics for modeling poetry writing; virtual courses; visual icons in myth; the development and demise of 8 millimeter film loops; women's history in visual and audiovisual education; student-developed visual productions; a cartographic interpretation of visual literacy; enabling learners through technology; a graphics systems approach in industry; the philosophy of representation; student nurses' perceptions of hospital staff modelling behaviors; deconstructing visual images of indigenous people; children's spatial visual thinking in a hypermedia environment; creating critical thinkers; perception in physics; using graphics for integrated planning; revisioning in storytelling; a local history preservation project; visual learning in biology; imagery, concept formation and creativity; visual themes in gravestones; visual design principles in World Wide Web construction; digital camera editing; digital cinema principles and techniques for multimedia development; culture reflected in tombstones; challenges for hypermedia designers; visual literacy in Web Page creation; the potential of dynamic computer presentations; technology mass media, society and gender; obstructive interactive television designs; gender equity online; a study of intertextuality in television programming; children's understanding of visuals in television interviews; children's attention in television viewing; instructional design process models; and international use of the electronic presentation. (AEF)

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VisionQuest: Journeys Toward Visual Literacy

Selected Readings Edited by
Robert E. Griffin
J. Mark Hunter
Carole B. Schiffman
William J. Gibbs

International Visual Literacy Association

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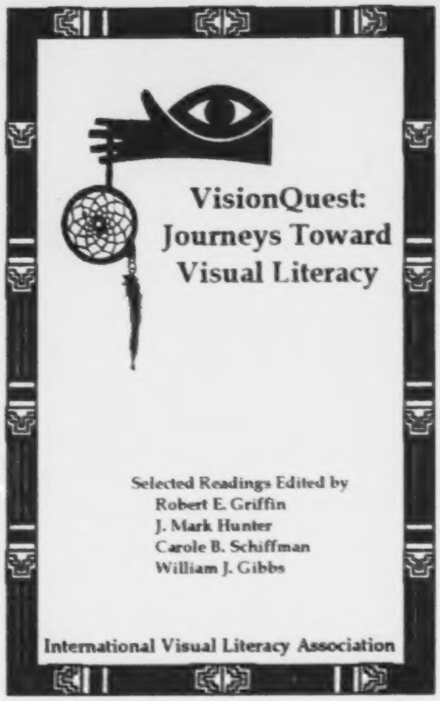

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JURIED PROCEDURE

This book has been compiled using a juried procedure to guarantee a high quality publication. The procedure began with planning of the International Visual Literacy Association annual conference in the early spring. Part of the conference planning procedure is to appoint a Paper Selection Committee to write the Call For Papers for the conference and subsequently serve as a screening committee for papers to be presented at the conference. Authors that make it through this stage of the screening are permitted to present their papers at the annual conference.

All writers are then permitted to submit their conference papers for possible publication in the annual book of readings. These papers are submitted to the Editor of the Readings at the annual meeting. The Editor is selected by the Chairman of the International Visual Literacy Association Publications Committee. Individuals who wish to be Editor of the Readings submit a letter of request to the Chairman of the Publications Committee one year in advance of the publication.

The Editor of the Readings distributes the collected papers to the book's Associate Editors for review and comment. The rejection rate for this year's book was 16% based on the number of papers submitted at the second level screening. The rejection rate is considerably higher if you consider the level of review at the conference level. Please request further information about the review process from:

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Selected Readings of the
International Visual Literacy Association
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PREFACE

As the senior editor of the Book of Selected Readings for the second year, I am proud of last year's publication and am looking forward to your approval of this year's effort. This year we have included the high quality writing that you have learned to expect from the Readings, the Editors' Choice Award and a new feature, the Graduate Student Editor appointment. We hope our efforts are of value to you.

This is the second year for the Editors' Choice Award. This year's winner is Dr. Dennis Dake for his paper **A Personal Vision Quest: Learning To Think Like An Artist**. When I took over the job of Senior Editor of the Readings one of the previous editors, Darrell G. Beauchamp told me that I could always count on Dennis's papers being of high quality. That proved to be completely true; his papers rarely even need to be edited. Wow...an artist that can write too! Be sure to read the paper, it is an autobiographical study of the growth of one person and how he has developed his own visual literacy. You will love the work...the editors did.

I also hope you acknowledge the work of our Graduate Student Editor, Jung Lee. The Graduate Student Editor is a new addition this year. With this new tool, IVLA hopes to identify new talent for the organization and to highlight the work of highly active graduate students. Ms. Lee also has co-authored a paper that is in this book. When you see Jung Lee at a meeting, be sure to acknowledge her contribution to IVLA.

As was the case last year, I have chosen not to categorize the papers in a particular order. The papers clearly rebel against fitting neatly into compact slots. But isn't that also the personality of IVLA? None of us fit into tight little categories. What I like so much about this organization is that we all are engaged in our own quests to expand the nature of visual literacy, these papers reflect that quest. Let me close with the prayer that I used in last year's publication...

We hope that you enjoy this book and that its' words and pictures guide you to new heights. May the work shown here contribute to the future.

ACKNOWLEDGMENTS

The work on another book of Selected Readings has come to a close. Boy...does it feel good to be done. It was only one year and one day ago that I sat at my computer typing a similar page announcing last year's book. I'm honored to be chosen as lead editor of the publication again this year.

Adhering to a strict schedule is the only way to accomplish this task and, as many of you know, it is hard to stick to a schedule. The materials for the book must to be sent to our friend Tom Wagner at Omni Press before the Christmas holiday in order to have the publication available for distribution at the Association of Educational Communications and Technology meeting in February. With the help of authors, editors, staff and printer it all gets done on time.

While I'm on the subject of editors, I want to give a big thanks to Carole Schiffman, Mark Hunter and our newest associate editor, Bill Gibbs for a great job. I received everyone's papers on the same day to send out for the final rewrites. I am lucky to be blessed with a great team. I also want to thank Jung Lee, who receives her own page in this book for her work as a graduate student editor. She did a superb great job with our new experiment and she is a great person to work with. It's good to work with dependable people.

The conference planning group in Wyoming need to recognize how helpful they were to the outcome of this book. Andrew Yeaman's presentation selection committee did a solid job in sorting through many proposals to derive a great collection of presentations. The Wyoming crew made my efforts very easy. I voice the sentiments of all IVLA members when I say that we will be happy to come back to Wyoming anytime!

A great deal of thanks also needs to go to my new staff assistant, Marcella Fickes. She has been the person to handle all of your panic calls. She has only been on the job for four months and had never been through the publication process before. She did a wonderful job.

I want to thank the unseen person in this process, Tom Wagner from Omni Press, printer of this book for IVLA. His calm voice is always helpful in solving my printing problems. I have never met Tom in person, but I have a vision of a guy with a halo over his head sitting in an old wooden office chair solving problems. He always makes me feel like he is there just to help me. Thanks for everything Tom from all of the members of IVLA.

Thank you also to my University, Penn State, and the Deans of the Smeal College of Business Administration, J.D. Hammond and Pete Bennett, for their support in making this publication possible. Their willingness to provide the time and equipment for me to complete this assignment is appreciated.

Finally, I want to thank my family and the families of all the other people associated with this book. Without your help we would never be able to succeed in this type of effort. My thanks to Wheez, Rob, Bear, Big A and Little A for their help, and for letting me on the computer from time to time to finish this work.

Robert E. Griffin
State College, PA
December 20, 1996

GRADUATE STUDENT EDITOR

Jung Lee
University of Wyoming
Graduate Student Editor, 1997 Edition

The International Visual Literacy Association launched a new project this year designed for the new members of our profession. Our plan is that each year a graduate student will be identified to serve as a Graduate Student Editor for the book of Selected Readings. The Graduate Student Editor will be selected to represent the institution that IVLA is visiting that year for the annual conference. The student will be selected by the senior editor of the Book of Selected Readings. His or her job will be to assist the editors in reading the papers that will be included in the book. The Graduate Student Editor will share in all of the responsibilities of the other editors.

The first recipient of the Graduate Student Editorship is Jung Lee from the University of Wyoming. Ms. Lee, a native of Korea, is a doctoral student majoring in Instructional Technology. She is a student of Dr. John Cochenour and Dr. Landra Rezebek. Her research interests center on hyper media and Internet based interactive learning systems.

After serving in her editor role Ms. Lee was asked to comment on and evaluate the responsibility for future student editors. She said, "as a graduate student it was a great honor and unique opportunity to participate in editing papers. It allowed me to prepare for my future in the professional world. I sincerely thank IVLA, the editors of the Book of Selected Readings, Dr. John Cochenour and Dr. Landra Rezebek for giving me the opportunity, and I hope it will be shared with other graduate students." As you read the papers included in this book I think you will agree that Jung Lee has done an excellent job!

TABLE OF CONTENTS

A Personal Vision Quest: Learning To Think Like An Artist (Editors' Choice Award Winner) 1
Dennis M. Dake

Information Design Via The Internet 11
Hilary McLellan

"Our Town: An Architectural Perspective": A Program For Inner-city At-risk Children 17
Claire B. Gallagher

The Effects Of Dubbing Versus Subtitling Of Television Program 23
Fattawi Mokhtar

Questing Toward Cohesion: Connecting Advertisements And Classroom Reading Through Visual Literacy 33
Ann Watts Pailliotet

Old Dad And Edna St. Vincent Millay: Tools For Humanizing the Visual 43
Elizabeth (Betty) Cramton
Beverlee Kissick

A Review Of Slim Hopes: Advertising & The Obsession With Thinness 47
Richard Couch

Hypermedia: New Dimensions of Literacy 49
Mary L. McNabb

Perception Of Elementary Students Of Visuals On The Web 55
Manal A. El-Tigi
Barbara Lewis
Virginia M. Mac Entee

The White Man's Indian: Stereotypes In Film And Beyond 63
Charalambos Vrasidas

Teachers' Perceptions Of Instructional Design 71
Ann S. Dana

Visual Exercises: A Quest For Alternative Measures Of Student Learning 81
Robert Sitz

Tri-Coding Of Information 91
Timothy Simpson

Diversity In Cyborg Images: A Case Study Of Barry Levinson's *Toys* 101
Linda E. Lucek

Linking Reading And Writing: Concept Mapping As An Organizing Tactic 109
Rionda Osman-Jouchoux

The Meaning Of Color In Trademarks 119
Ed Johnson

An Opportunity For Visual Literacy In The K-4 Classrooms Of Ohio 131
Colleen M. Sexton
John C. Belland

Visual Fidelity and Learning via Computer-Based Simulations 137
Glen A. Holmes

Design Issues Adapting a Visual Paper-and-Pencil Test to the Computer: A Case Study - The Figure Classification Test 141
James M. Washington Jr.

Representing The Ghetto Playground: From 'Be Like Mike' To Hoop Dreams 149
Jeffrey Chown

Mapping The World Through Science And Art 157
Lydia Dambekalns

Light Skinned With Good Hair: The Role Of The Media And Christianity In The Maintenance Of Self-Hatred In African Americans 161
Omowale Akintunde

The Growing Need For Visual Literacy At The University 169
Jerry T. Christopherson

Imagery and Synectics for Modeling Poetry Writing 175
Jeanne L. Dykstra
Frank E. Dykstra

Virtual Courses And Visual Media 179
William J. Gibbs
Patricia J. Fewell

Travellers And Cowboys: Myths Of The Irish West 185
Gretchen Bisplinghoff

The Development And Demise Of 8MM Film Loops In America 191
Rebecca P. Butler

Women's History In Visual And Audiovisual Education, Where And How To Find It 197
Rebecca P. Butler

Visual Productions And Student Learning 201
Marilyn Bazeli

A Cartographic Interpretation of Visual Literacy: A Historical Perspective 207
Cindy L. Kovalik
Kim Lambdin

Visual Literacy And Just-In-Time Training: Enabling Learners Through Technology 217
Terry Burton

Attaining Visual Literacy Using Simplified Graphics In Industry 225
Terry Burton

A Philosophical Discussion of Representation 235
Sandra E. Moriarity
Keith Kenney

Student Nurses' Perceptions Of Hospital Staff Modeling Behaviors 243
Sherise L. Valentine

Quest of Visual Literacy: Deconstructing Visual Images of Indigenous People 247
Ladislaus Semali

Exploring Children's Spatial Visual Thinking In An HyperGami Environment 257
Patricia McClurg
Jung Lee
Maria Shavalier
Kermit Jacobsen

Creating Critical Thinkers 267
Marilyn Bazeli
Rhonda Robinson

Perception In The Invisible World Of Physics 275
Lisa Novemsky
Ronald Gautreau

Using Graphics for Integrated Planning 285
Peggy A. P. Pruisner

Story Re-Visions: Tales For The Future 291
Jacqueline W. Gray

Celebrating Cody: An Opportunity To Present A Visual History 297
Carmela A. Conning
Jeannie Cook

Visual Learning in Field Biology 301
Ethel D. Stanley

Imagery, Concept Formation And Creativity - From Past To Future 305
Asael Silverstein Ora. N

Grave Songs in Stone 313
J. Mark Hunter

Visual Design Principles Applied To World Wide Web Construction 319
Donald D. Luck
J. Mark Hunter

Vertical Hegelianism And Beyond: Digital Camera Editing 325
Roger B. Wyatt

Digital Cinema Principles and Techniques for Multi-Media Development 329
Roger B. Wyatt

Wyoming Tombstone Symbolism: A Reflection Of Western Culture 335
John Cochenour
Landra L. Rezabek

Hypermedia as a Distinct Medium: Challenges for Designers 345
Barbara Clark
Nancy Nelson Knupfer

Creating Web Pages: Is Anyone Considering Visual Literacy? 355
Barbara I. Clark
Nancy Nelson Knupfer
Judy Mahoney
Kevin M. Kramer
Hamed Ghazali
Nabel Al-Ani

Visualizing Instructional Design: The Potential of Dynamic Computer Presentations 363
Nancy Nelson Knupfer
Misook Ji
Theresa E. Gram
Hamed Ghazali
William J. Rust
Huei Chu Chen
Kevin M. Kramer

Out of the Picture, Out of the Club: Technology Mass Media, Society and Gender 373
Nancy Nelson Knupfer
William J. Rust
Judy E. Mahoney

Obstructive Interactive Television Designs: The Influence of Culture, Gender and Power 381
Nancy Nelson Knupfer
Theresa E. Gram

Gender Equity On-line: Messages Portrayed With and About the New Technologies 391
Nancy Nelson Knupfer
Kevin M. Kramer
Debra Pryor

A Thinking Person's Comedy: A Study Of Intertextuality In Cheers 401
Anthony Hlynka
Nancy Nelson Knupfer

A Preliminary Study on Children's Understanding of a Visual Used in Television Interviews 411
Georgette Comuntzis-Page

Factors Affecting Children's Attention on TV Viewing 421
Sophia T. Wu

Perceptions Of Instructional Design Process Models 429
Robert Maribe Branch

The Electronic Presentation: A Status Report Of International Use 435
Robert E. Griffin
Rune Pettersson
Ronald Johnson

Editors' Choice

A Personal Vision Quest: Learning To Think Like An Artist

by Dennis M. Dake

Abstract

This paper describes thirty years of visual exploration by the author, a professional artist. Using the metaphoric story device of two tribes, one that builds their culture around words and the other which depends primarily on visual perception, the paper suggests a distinctive mental paradigm at work within the society of artists, who pursue visual literacy through the experience of graphic ideation. The author's individual story of visual development and understanding is supported throughout the paper with the findings of numerous studies in psychology and neuropsychology which show a growing scientific awareness of the distinctive visual thinking style of artists.

"Each hemisphere (of the human brain) has its own private sensations, perceptions, thoughts, and ideas all of which are cut off from the corresponding experiences in the opposite hemisphere. Each left and right hemisphere has its own private chain of memories and learning experiences that are inaccessible to recall by the other hemisphere. In many respects each disconnected hemisphere appears to have a separate 'mind' of its own." Roger Sperry, Nobel Laureate (Sperry, 1976)

A Metaphor: The Two Tribes

There are two tribes in this world. The dominant tribe, the tribe of the word, lives in a valley separated from the "other" tribe by a great mountain range. Little is known about the second tribe, the tribe of the vision, which lives in the valley on the opposite side of the mountains.

There are rumors that the tribe of the vision is quite different from our kind. Rumors have it that they worship different, heathen gods and practice strange irrational rituals. The tribe of the word, as you know, has developed a culture of sophistication and critical thought. Through the use of discursive symbolism, parsing all thought into numerical and written symbols, our ancestors have given us great precise control over knowledge concerning the structure and functioning of the surrounding universe. With our young, we begin in the earliest years of life to stress the standardization of outcomes from our educational factories. As our young are initiated into the knowledge of the word, they gain in stature until some few are granted the level of expertise that allows them to become executive controllers of the hierarchical structure. Accountability is prized at all levels of our culture and the more quantitatively anything can be assessed the richer the reward. Our culture has a special mandate from the omnipotent creator of all, for in the beginning was the word.

This paper is report from the tribe of the vision, a message from the other side of the mountain. In this tribe dwell the humans who call themselves, artists.

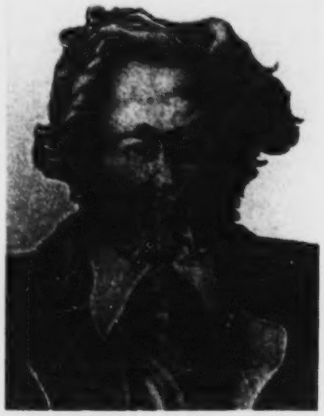

Figure 1
Self Portrait

Portrait Of The Artist As A Certifiable Schizophrenic, 1980, Watercolor, 23 X 29" (copyright Dennis M. Dake)

As a representative of this tribe of the vision, let me tell you that we are very suspicious of the intentions of the tribe of the word. Our leading priests have warned us repeatedly of the danger of dominance by words. Many in our tribe distrust words and the misunderstand-

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ings they can lead to. We all use words and think we know what they mean but our ancient stories tell us that for many people the same words have different meanings. A potential for verbal misunderstanding leads to many problems for our tribe, which must have a clear and creative vision in order to survive. For example, our legendary leader, Leonardo DaVinci once wrote, "The supreme misfortune is when theory outstrips performance." For the tribe of the vision performance must come first. In modern times, the warnings against over reliance on words have grown increasingly strident. Cezanne the father of our current social order said, "Talking about art is almost useless.". While we have often received emissaries from the tribe of the word, who talk endlessly about our culture, we often wonder, "do they really understand how we think". Our tribe understands the precision and control of thought possible with discursive symbolism, but we believe that presentational symbolism is a superior way to understand the world.

Our quest, in the tribe of the vision, is to construct visual images which are the closest fitting equivalent of the individual's underlying experience. This poetic vision of the world, we know, can resonate on multiple levels of meaning simultaneously, representing so much more, holistically, than words can ever hope to convey. In our dealings with the tribe of the word, we find them unfailingly serious in their obsession with converting everything into abstract symbols. Don't they appreciate the playful experimentation that leads to creativity and beauty? Our knowledge is known to us through intuition and aesthetic sensitivity without resorting to words. Why don't the people on the other side of the mountain see what we mean?

"In the artistic process, which involves a novel arrangement of familiar elements to form an affective message, the right hemisphere may provide the neural substrate for fresh perspectives or insight, simply because of its different mental modus operandi." A. Schweiger, Neuropsychologist (Benson & Zaidel, Eds. 1993)

Editors' Choice

The Education Of A Visual Artist

My life as a visual artist has been lived as an interested explorer wandering between the tribe of the word and the tribe of the vision. (Figure 1) While visual artists usually prefer to remain on their side of the mountain, my fate has been to try to learn from both groups and explore what they have to offer to each other.

My earliest education did not include a grounding in the visual discipline of an artist. There were no art teachers to teach in my school system, no artists lived in my small town, and no one attended art galleries or museums. The tribe of the word seemed the total focus of the educational system and the culture. Therefore, during college art training, I found myself without a developed understanding of the thinking styles and disciplined visual dialog processes characteristic of artists. There was always a struggle to find visual ideas for class assignments.

The Importance of Memes

During the early 1960's, the midwest was being fully exposed to the influence of abstract expressionism, which had flourished in New York ten to twenty years earlier. Abstract Expressionist role models, for me, from the tribe of the vision were the artists Franz Kline and Wilem DeKooning. I greatly admired their free

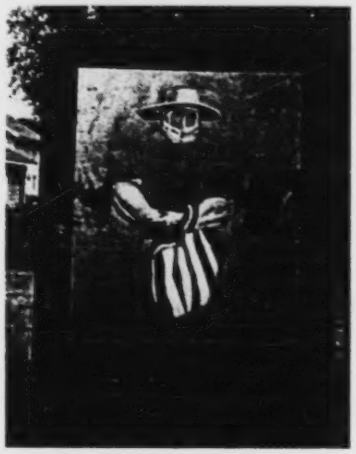
Figure 2
Abstract Expressionist Painting
Untitled, Acrylic, 21 X 23", 1967
(copyright Dennis M. Dake)

and expressive use of brush work with paint. The art works of Kline and DeKooning, viewed in books and magazines, continued to guide my thoughts and approaches to art well into my graduate school years. (Figure 2)

Eventually, however, the heavily introspective and idiosyncratically methods and ideology of abstract expressionism, which had intrigued and captivated me for many years, became a dead-end path for continued visual development. I found myself continually copying the solutions from my previous work. Purely subjectively based exploration, I came to see, was primarily of individual interest and was not critically attached to the long-term, transpersonal discipline of art.

While searching for new vision guides on my artistic quest, I discovered the artist Larry Rivers who became increasingly important to me. Rivers represented a bridge from the abstract expressionist immediacy of gesture and expression to the more traditional disciplined exploration with representational draftsmanship and subject matter. (Figure 3) Rivers spoke to me, in the manner of a true spirit guide, of the initiation rites in disciplined artistic thinking necessary for membership in the artistic tribe of the vision.

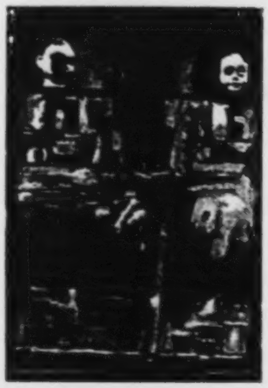
Figure 3
Painting Inspired By Art Of Larry Rivers
Patriot At The Parade, Acrylic, 50 X 60", 1968
(copyright Dennis M. Dake)



Editors' Choice

The importance for young artists of artistic role models as vision guides was given clarity, when during the last year, I discovered, in the tribe of the word, the ideas of R. Dawkins. Dawkins postulates the existence of memes, the smallest recognizable pieces of cultural information. Memes are defined as closely analogous in cultural evolution to the role that genes play in biological evolution. The transmission of memes is said to account for the evolutionary continuity and on-going development of cultural information. Encounters with influential memes which have informed the development of my art work have included those found in the work of Rivers, Kline, DeKooning, Cezanne, Matta, and others. (Figure 4) I have come to see that much visual and structural knowledge has been transmitted to me through holistic meme units.

Figure 4
Work Inspired By Art of Franz Kline
The Poor People Next Door, Mixed Media, 18 X 24", 1969, (copyright Dennis M. Dake)



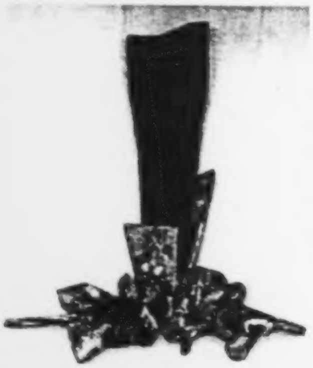
Holistic memes have given me a perception of the ethical values and biases of the tribe of the vision. These values have centered on the primacy of visual understanding and communication over and above verbal symbolization and expression. As an older ancestor of the tribe, Paul Cezanne, expressed it, "Talking about art is almost useless." Without consciously knowing it, this preference for visual communication, in opposition to communication in words and numbers, was the first of many clues to understanding the tribe of visual artists.

Laterality and Dominance in the Brain

In the years since my formal art education was completed, I have discovered several further explanations for the ingrained preference of the tribe of the vision for visual thought and communication over verbal discourse. The literature with the most important explanatory power for me has centered around the overriding executive control and dominance of the parsing, linear thought processes of the left hemisphere of the human brain. This dominance has been shown by neuropsychologists to have an extremely inhibitory effect on the visual based, holistic thought structures of the visio-spatial processing right hemisphere.

This inhibition of one hemisphere of the brain against the functions of the other hemisphere, makes, as artists have known for hundreds of years, expanded growth of visual dialog and thought difficult. For example, a chance comment from a painting teacher in the late 1960's, that the shaped canvases that I was working on were, "more sculpture than painting," (Figure 5) effectively convinced me to end that visual line of inquiry. The inhibitory effect of this simple verbal comment was so powerful that it has only been in the past two years, nearly 30 years later, that I have again felt visually compelled to return to a deep and compelling visual logic that shaped canvases once held for me. (Figure 6) Words can create a formidable barrier to visual thought. A preference for relying on the visual over the verbal is a major boundary between the territories of the two tribes of the world.

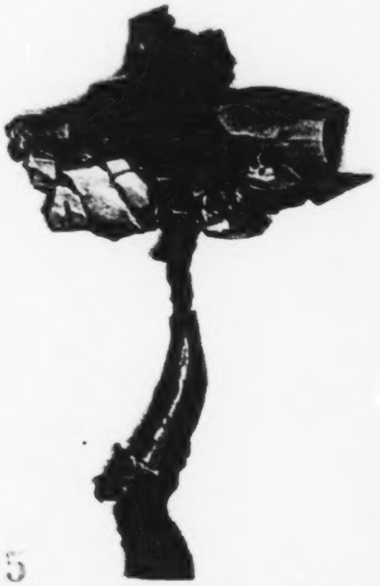
Figure 5
Shaped Canvas - 1969
Untitled, Acrylic & Sand, 45 w x 62" h, irregular shape
(copyright Dennis M. Dake)



Neuropsychology Of Artistic Thinking

As my teaching career has moved from the high school to the university level, there has been a greater need to continually move back and forth between the separate worlds of the two tribes. Both because I have worked in the area of art education, which requires clear and logical explanations for artistic phenomena, and because of youthful over immersion in the tribe of the word, I have experienced an increased need to search out plausible explanations to explain my continuing lack of visual understanding. This exploration has led me to some interesting scientific explorations in psychology and neuropsychology, from the other side of the mountain.

Figure 6
Shaped Canvas - 1996
Untitled, Acrylic on Canvas, 43 x 71", irregular shape
(copyright Dennis M. Dake)



Editors' Choice

Figure 7
Cloth Model for Tie and Die Series
original photography,
(copyright Dennis M. Dake)

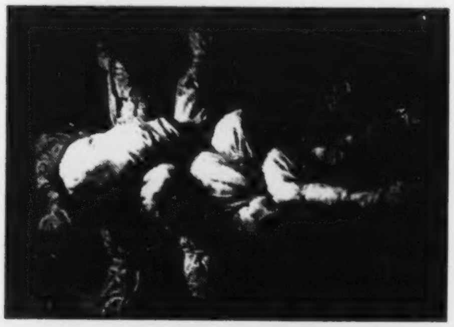
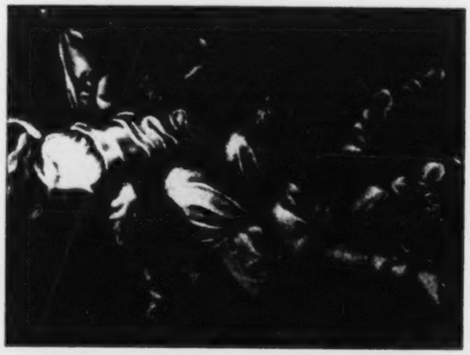


Figure 8
Painting From Cloth Model
Thought Experiment # 6, Acrylic, 36 x 48", 1976
(copyright Dennis M. Dake)



Abstract Basis Of Visual Thought

An abstract basis for vision has been studied for many years by the scientific community but only in recent years have studies demonstrated that artist's perceptions depend upon physiological processes that pull in abstract structures. Neuropsychologists studying the scanpaths of saccadic eye movements in artists and non-artists (Zangmeister, Sherman, and Stark, 1995) found that professional artists and sophisticated viewers of art had significantly different patterns than individuals in control groups from scientific fields. A demonstrated higher ratio of global scanpaths (for large abstract structures) to smaller saccadic scans for details provides the artist and trained observer with more awareness of the abstract structures underlying visual perception. Artists are then better able to control and manipulate the visio-spatial abstract structure of their visions for communicative and creative purposes.

My own studio research, indicates that progress in developing all types of visual ideas requires a disciplined and conscious focus on the abstract properties underlying outward illusions of form. In a series of airbrushed watercolor paintings which I titled, "Tie and Die," I explored abstract forms that seemed intuitively to be the visual equivalents of my own mental processes. These paintings were developed from 3-dimensional models of twisted and bundled cloth. (Figure 7 & 8) As I reported in an earlier paper, presented to the International Visual Literacy Association (Dake, 1993), I was startled after finishing this series when a respected scientific observer suggested that these paintings were a cognitive exploration of the asymmetrical, mathematical functions of fractals. Could this series of personally derived visual forms represent cognition without discursive symbolization? (Figures 9 & 10)

Allusive Thinking And Art

Psychologists have identified additional differences between the thinking of visual artists and those without artistic inclinations and/or training. Experiments to identify and categorize the nature of this artistic thinking show that visual artists of acknowledged creativity demonstrate much greater use of allusive thinking than non-artists. (Tucker, Rothwell, Armstrong, and McConaghy, 1982) Allusive thinking is defined as loose categorical thinking based on broader attentional processes than critical, verbally based thought. In an age that encourages non-representational as well as representational art forms, this ability for allusive thinking patterns may even confer a competitive advantage on certain visual artists. "At present, when non-representational visual art is more valued, allusive thinking artists would appear likely to be more successful, in view of their ability to produce work rich in allusions operating at a less conscious level and hence less immediately obvious to the viewer." (Tucker, et. al, 1982)

Editors' Choice

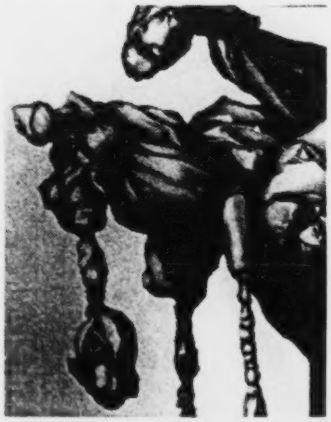
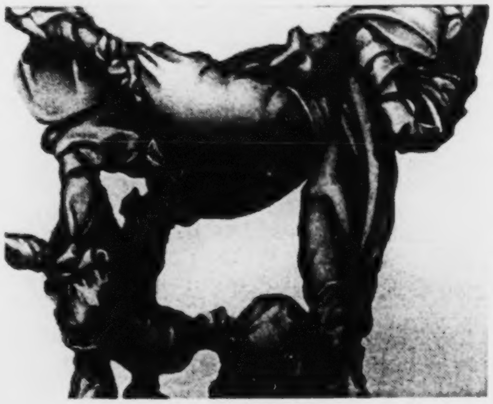


Figure 9
Tie and Die Painting Experiment

Thought Structure # 8, Watercolor, 23 x 29", 1979
(copyright Dennis M. Dake)

Figure 10
Tie and Die Painting Experiment

Thought Structure # 9, Watercolor, 29 x 23", 1980
(copyright Dennis M. Dake)



Visual Cognition

The ability of humans to think by visual means alone has been explored within science and written about in the cognitive literature from the tribe of the word. For example, in the book "A Second Way of Knowing: The Riddle of Visual Perception", Edmund Bolles reexamines the "Top Down" gestalt basis of visual perception and contrasts its strengths with the limitations of the mechanistic "Bottom Up" approach of much current perceptual psychology. Bolles postulates that both approaches can lead to new knowledge, although the latter usually does not recognize the former as representative of intelligent thought.

A specific example documenting visual cognition was published in the neuropsychology journal, Brain, (Zeki and Lamb, 1994). In their article, The Neurology of Kinetic Art, these two scientists argue that over a 40 + year period of time artists developed kinetic art forms which foreshadowed later neurological explorations of the functions of the primary visual cortex of the brain. Specifically Zeki and Lamb contend that kinetic artists "unknowingly" isolated and explored the functions of the V5 area of the primary visual cortex which processes motion to the exclusion of color, shape, or other aspects of visual experience. Converging lines of exploration and reasoning such as this give hope that the tribe of the word will eventually understand and accept the nature of visual cognition.

Psychomorphology

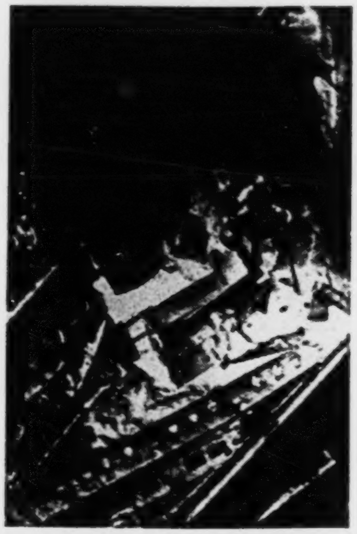
Within the tribe of the vision, I have discovered that all configuration sources are legitimate and equally full of potential. The logic we, of the tribe, respect is purely intuitive and visual. Using these mental processes, over the past 10 years, the range of my visual experiments has broadened to include a larger variety of invented and discovered forms. The sources of these new design ideas have come from both nature and man made forms. My visual ideation to discover evocative visual images begins with the archival photographic documentation of interesting forms from nature and random mechanical configurations, found in such places as automobile junkyards. At the beginning of this series of paintings, I layered several photographic images on top of each other, using visual interest as the sole criteria for selection. (Figures 11 & 12)

Homospatial Thinking

After completing this series of paintings, I discovered that research by scientists interested in the creative functions of the human mind has suggested that the superimposition of separate entities and phenomena in the same space within the human brain is the triggering mechanism for creative thought. This type of thinking has been called homospatial thinking. (Rothenberg 1986) Homospatial thinking is a form of visual epistemology well respected in the tribe of the vision although it may seem random and chaotic to humans on the other side of the mountain. The order and pattern of this type of thinking lies below the level of superficial appearances. Homospatial thinking acknowledges that the viewer of any visual form makes an important contribution to the meaning of his/her perceptions. Objective sensations of visual phenomena are always filtered through a mental filter consisting of the viewer's expectations and past experiences. Each viewer then puts together their perceptions as unique and individual constructions.

The visual art forms which I have developed over the past 10 years are designed as rigorous experiments to explore this visual mind - form interaction. I have on other occasions (Dake, 1995) called this original discipline, psychomorphology. Psychomorphology holds that the mind (psycho) and the world of visual forms (morphology) are intimately and integrally intertwined.

Figure 11
Layered Photographic Negatives As Visual Inspiration For Painting
(copyright Dennis M. Dake)



Design Fluency & Low Spatial Frequency

Over the past 3 years, my visual research has shifted to a series of shaped canvases that break the mold of rectangles, a painting format used almost exclusively by painters since the Renaissance. Inspired by rocks from the coast of Maine and the crumpled scraps of metal from destroyed automobiles, I have created a series of shaped wood and canvas forms which I think of as analogous to stimuli used in a scientific experiment. These forms are developed by continual, flexible, and extended manipulation of sections of ambiguous, out-of-focus photographs to visually discover a spirit of equivalency with my life experiences. (Figure 13)

Flexibility and fluency are necessary to effectively develop such effective visual stimuli. This design fluency has been identified with the right hemisphere of the brain. Two neuroscientists (Jones-Gotman and Milner, 1977) have through the study of brain damaged individuals, identified the right frontal and right fronto-central areas of brain as most implicated in design fluency in a non-verbal mode. Other scientists have found that to engage the right hemisphere it is important to draw upon the demon-

Figure 12
Psychomorphology Experiment
Artist's Perspective, Acrylic, 40 x 60", 1989
(copyright Dennis M. Dake)

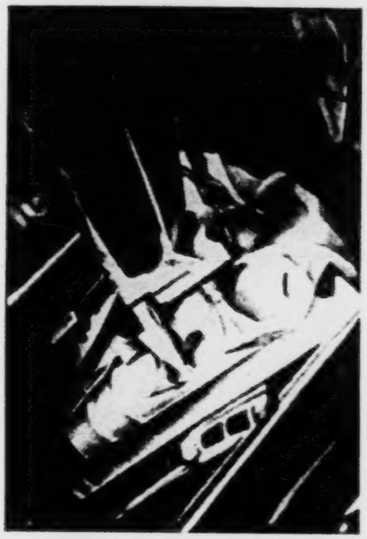


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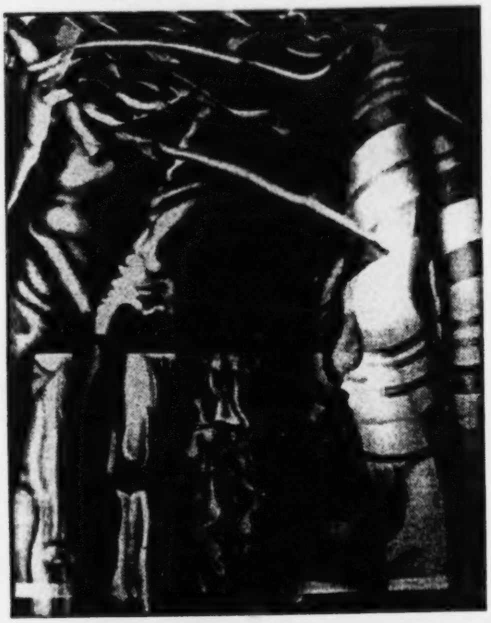
Figure 13
Psychomorphology Experiment
Out of the Blue, Acrylic, 28 x 36", 1989
(copyright Dennis M. Dake)



strated task sensitivity of the right hemisphere to "fuzzy" visual stimuli of low spatial frequency (Semmes, 1968). Diffuse representation of information in the right hemisphere contributes to an ability in creative individuals to integrate dissimilar units into new and previously unseen inventions. Leaders of the tribe of the vision have attested to the inventive power of low frequency, right hemispheric processes. Leonardo DaVinci said it most eloquently:

> "When you look at a wall spotted with stains, or with a mixture of stones, if you have to devise some scene, you may discover a resemblance to various landscapes, beautified with mountains, rivers, rocks, trees, plains, wide valleys, and hills in varied arrangement; or again you may see battles and figures in action; or strange faces and costumes, and an endless variety of objects, which you could reduce to complete and well drawn forms. And these appear on such walls confusedly, like the sound of bells in whose jangle you may find any name or word you choose to imagine." (Mac Curdy, 1938)

Editors' Choice

Reconstrual and Bisociation

The logic of the tribe of the word relies on the integration of similar units of information. The logic of the tribe of the vision prefers the fertile interactions of dissimilar units. The bisociation, cross fertilization within a single human brain, of previously separated "dissimilar" information sources into new combinations is the primary mental process in human creativity. (Koestler, 1977)

At a subconscious level all incoming visio-spatial messages are continually correlated, in a rapid fire process of comparison, with other similar structural units from past experiences. This process has been titled, "reconstrual" by psychologists (Peterson, 1993) studying the processes of creativity and discovery. Individuals who have been initiated into the tribe of the vision have a developed sensitivity to the process of reconstrual. Members of the tribe of the vision are able to tap into isomorphic forms of analogical thinking which occur early in visual processing in the right hemisphere of the

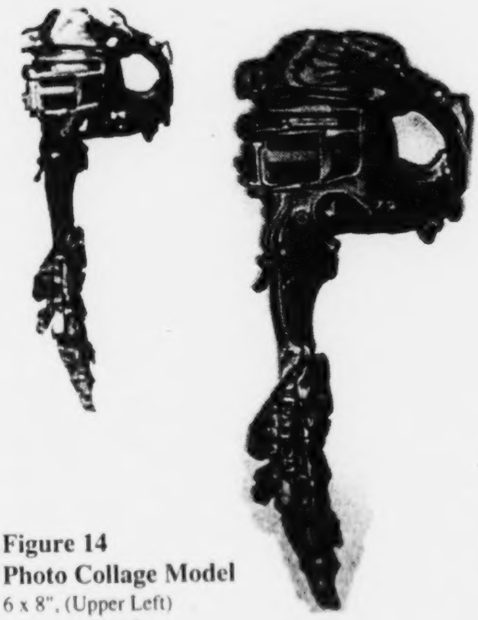
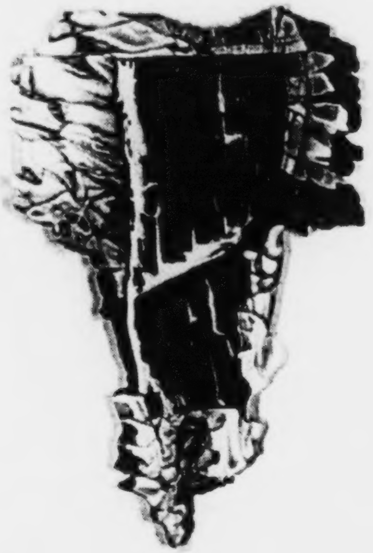


Figure 14
Photo Collage Model
6 x 8", (Upper Left)
And
Psychomorphology Experiment
Untitled, Acrylic, 71"h x 29"w, irregular shape
1995, (Right). (copyright Dennis M. Dake)

Editors' Choice

Figure 15 Psychomorphology Experiment
Untitled, Acrylic, 48"h x 32"w, irregular shape, 1996
(copyright Dennis M. Dake)



brain. The richness of the multiple associations obtained in this way lend a richness of contextual meanings to everything seen and created.

Because perception is so variable, I have begun to experiment with abandoning the rectangular, Renaissance "window on the world" that implies a stable, single one-eyed observer with a set point of view. (Figure 14) My intention, as best I can state it to you in discursive form, is, not to convey any predetermined message but to rather provoke the mind of the viewer to original invention and creation. (Figure 15) Psychomorphology is backed up by research from the both tribes of the world.

The Vision Quest Goes On

My personal and professional, artistic vision quest goes on. My goal, is an undefinable sense of beauty and order that, in the end, I can not explain in words. I am challenged by the creation of visual stimuli that can arouse in the viewer an abstract, allusive, and poetic perception of the world. This ability, which is popularly called imagination, requires taking full responsibility for one's visions and the manner in which they are communicated. As my research develops, I hope to deepen my understanding of this process of visual cognition, the universal birthright of every human.

The two tribes of this world should be equally home to all human beings. We are all on a vision quest whether or not we have ever been formally educated to "see" the true nature of our abilities. As with the traditional verbal literacy skills of the tribe of the word, visual literacy involves not only passive reading skills but the active acquisition of knowledge and understanding through the practice of ideation skills. Visual Literacy requires a deepening of visual understanding achieved through visual experience in addition to the word based study of human perception.

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Information Design Via The Internet

by Hilary McLellan

Abstract

This paper describes a course on Information Design implemented entirely via Internet. The design model of a virtual community was used, featuring thirteen design components: (1) Competence, (2) A shared, understood goal, (3) Mutual respect, tolerance, and trust, (4) Creation and manipulation of shared spaces, (5) Multiple forms of representation, (6) Playing with the representations, (7) Continuous but not continual communication, (8) Formal and informal environments, (9) Clear lines of responsibility but no restrictive boundaries, (10) Decisions do not have to be made by concensus, (11) Physical presence is not necessary, (12) Selective use of outsiders for complementary insights and information, and (13) Collaboration's end.

Introduction

This paper will describe an experimental course on Information Design that was implemented entirely via Internet, including World Wide Web, listserv, and email. Internet courses can be implemented in several different ways, to meet the distinctive needs of learners. The Information Design class was designed and implemented as a virtual community, based on a model put forward by Michael Schrage (1991, 1995).

Virtual Learning Communities

Just as a classroom where teacher and students are physically present develops into a community, however temporary, over the course of a semester, classes taught via the Internet become virtual learning communities, communities unbounded by physical space. According to Howard Rheingold (1993), "Virtual communities are social aggregations that emerge from the Net when enough people carry on those public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace." (p. 9) Rheingold further explains that, "People in virtual communities use words on screens to exchange pleasantries and argue, engage in intellectual discourse, conduct commerce, exchange knowledge, share emotional support, make plans, brainstorm, gossip, feud, fall in love, find friends and lose them, play games, flirt, create a little high art and a lot of idle talk. People in virtual communities do just about everything people do in real life, but we leave our bodies behind." (p. 3) People in virtual communities engage in learning, along with all these other activities.

Schrage's Model

How to create a virtual community that supports learning? Michael Schrage (1991) offers a model that highlights the importance of collaboration. According to Schrage, the goal should be to create a *shared experience* rather than *an experience that is shared*. An experience that is shared is passive. A shared experience is one that is participatory — a conversation or a discussion, as opposed to a speech, a lecture or a television broadcast. Schrage theorizes that electronic environ-ments such as the Internet and groupware offer immense potential as a context for supporting collaboration.

Collaboration is central to this model. "Collaboration is the process of shared creation: two or more individuals with complementary skills interacting to create a shared understanding that none had previously possessed or could have come to on their own. Collaboration creates a shared meaning about a process, a product, or an event. In this sense, there is nothing routine about it. Something is there that wasn't there before. Collaboration can occur by mail, over the phone lines, and in person. But the true medium of collaboration is other people." (Schrage, p. 40) Schrage emphasizes that in a collaborative relationship, the creation of value is the central issue; communication and team-work exist to support this.

Schrage presents a model of collaboration composed of thirteen design themes: (1) Competence, (2) A shared, understood goal, (3) Mutual respect, tolerance, and trust, (4) Creation and manipulation of shared spaces, (5) Multiple forms of representation, (6) Playing with the representations, (7) Continuous but not continual communication, (8) Formal and informal environments, (9) Clear lines of responsibility but no restrictive boundaries, (10) Decisions do not have to be made by concensus, (11) Physical presence is not necessary, (12) Selective use of outsiders for complementary insights and information, and (13) Collaboration's end.

Implementing Schrage's Model

The Information Design course taught via the Internet (including World Wide Web, listserv, and electronic mail) was designed on the basis of Schrage's model of collaborative communities. This course served 25 masters degree students across the western United States and Canada. The students enrolled in this class were dispersed, but many were clustered in nodes so that in some instances they could work together with classmates. For example, a number of students lived in or near Portland, Oregon. Sometimes they got together at someone's home or office to explore advanced Internet resources that could not be accessed on all the students' computers.

This kind of Internet-based course serves the needs of students seeking to extend their training without having to add too much of an extra burden to lives already filled with work and family obligations. Students can participate in an Internet-based class from home. They can log on to the class resources and activities on the Internet at their convenience. The students in the Information Design class were very enthusiastic about the convenient opportunity that this course offered them.

How did this class conform to Schrage's model? The following discussion will explain.

Competence

The course was based on competence with the technology underlying the course delivery — computers, modems, communications software. There was a wide range of Internet and even basic computer experience among the students enrolled in the class. Students who possessed more experience, shared their expertise, raising the level of competence for all. And when a technical problem, such as transferring homework file to the listserv stumped everyone, students collaborated in experimentation until a solution was reached. Furthermore, *developing competence* in terms of both technical skills and mastery of the content, were central to the purpose of the class. In this experimental class, a communal mind developed, with people's competences proving highly complementary and synergistic.

A Shared, Understood Goal

The class and its subject matter provided the goal, which was shared by all the students: to learn about information design through a new, experimental learning process that highlighted technology skills. This goal encompassed all of the themes that Schrage identified: problem-solving, creating, discovering, creating value — and developing competence, mastery.

Mutual Respect, Tolerance, And Trust

As any educator knows, this element of Schrage's model should be fundamental to all educational contexts and experiences. In practice, the teacher can set the tone, but occasionally problems can arise, often due to a single individual — someone who is not listening to others or who seems to need to know all the answers, to have the last word, creating his or her own debilitating barriers to learning while turning off and even intimidating other students. The Internet context can draw out these tendencies in a few students, more so than a face-to-face learning environment. Concommitently, interpersonal cues that might restrain this kind of behavior in a face-to-face setting are missing in the context of a virtual classroom. In these instances, the teacher must continually reinforce the collaborative premise of the virtual learning community.

In some ways, the Internet context creates a level playing field for diverse students, thereby diminishing sources of intolerance and mistrust. One student in the Information Design class commented that in the Internet format, topics were "distilled down to their intellectual component, with all extraneous variables removed." These extraneous variables include race, gender, different abilities, and appearances. The Internet format is not a panacea, and it is not equally appealing to all types of learners, but it can filter out such "noise" factors that interfere with communication and learning — once technical problems are overcome!

Creation And Manipulation Of Shared Spaces

In the Information Design class, the listserv provided a shared space that all could share in creating. Beyond that, students could identify the URLs for World Wide Web sites relevant to class topics and assignments, thereby providing pointers to the larger shared space of the World Wide Web itself. Some students added such URLs to their own Web pages as a resource for all the students in the class.

Multiple Forms Of Representation

Multiple forms of representation were central to the content of this course on Information Design. Illustrations, charts, photographs and graphic elements were featured along with text on the Web page "Cyberlectures," providing multiple forms of representation. This is something that can be applied to any kind of subject matter. As the capabilities of the World Wide Web advance, audio and multimedia will become widespread. However, in designing and implementing Internet-based courses it is essential to keep in mind that students accessing computers from home are less likely to have access to the full panoply of Internet capabilities than those accessible to students on campus with access to university resources.

Playing With The Representations

Learning activities that feature playing with different representations can be very valuable (McLellan, 1996a). Since the Internet provides information in different forms, it is ideal for this kind of activity. In addition, the Information Design class featured a Web page design assignment that specifically centered upon playing with representations: a map transformation assignment. Students were assigned to create a World Wide Web page featuring a map for a trip of their choosing, such as the morning ride to work, and translate it into three different forms of information: a visual map, formal directions using text, and an informal written description of the trip, based on their subjective perceptions and thoughts.

Continuous But Not Continual Communication

Communication must be timely. This includes timely responses to student questions and timely input to listserv discussions by students and instructor. Timeliness will vary in the context of the particular virtual class, but continuous monitoring of the listserv by the instructor is vitally important.

In this Internet-based class, students could log on to the listserv and the class Web pages whenever it suited their schedules. However, it was very important for students to participate in the listserv dialogue on a regular basis. Many students logged on daily. But a few students had problems staying in touch with the virtual community on a regular basis. Thus, constraints enforcing continuous communication are needed. Setting deadlines is an important strategy to motivate students to maintain continuous communication and engagement with class activities. At the same time, some flexibility must be maintained to accomodate technical problems, including student efforts initially to join and log onto the class listserv and Web pages as well as computer server crashes that may occur (due to growing pains, excessive demands, power failures, etc.) while the class is in progress, preventing access to class Web pages and other resources.

The telephone should not be overlooked in communications between students and the instructor. It provides a more open-ended forum for discussion and trouble-shooting than email. It's a great way to help students while eliciting valuable feedback. In addition, the telephone offers greater potential for the instructor to convey both personality and empathy than email.

Formal And Informal Environments

In this class, the listserv provided the primary informal space. Students submitted their assignments to the listserv, together with introductions, discussions, jokes, and anec-dotes. This class featured more assignments than a traditional class, specifically, short assignments that were smaller in scale and relatively informal, in keeping with the listserv format. Assignments were designed to support the possibility of wide-ranging discussions, which, indeed, resulted.

The World Wide Web component of the class acted as the formal environment. It featured the syllabus, weekly "cyberlectures," assignments, references, and related resources.

In contrast to much traditional teaching, the virtual community context centered around the listserv provided greater interaction between students as well as the opportunity for students to see each other's homework and respond to it, creating a more dynamic learning experience. This had valuable pedagogical implications. One student com-mented, "You all have such diverse approaches. It has been fun to follow your links and glimpse a bit of your personalities... this has been a good group to work with and learn from." Still another student had this to say: "Many thanks to all of you for being so interesting. I'm favorably impressed by your intellect, your creativity, and your hard work ..."

Clear Lines Of Responsibility But No Restrictive Boundaries

Clear lines of responsibility were established through the framework of the syllabus and the implementation of the class. Many of the class assignments centered around exploring resources on the World Wide Web; as a result, the boundaries of exploration were broad and unrestricted. And class discussions were unrestricted, except in rare instances when a student became domi-neering.

Decisions Do Not Have To Be Made By Concensus

In an educational context such as the class described here, the instructor is the final arbitor in decision-making. However, it is valuable to have students take ownership of the class by helping to determine certain things, such as discussion topics, helping classmates deter-mine how to solve technical problems, ideas for carrying out assignments, etc.

Physical Presence Is Not Necessary

The lack of physical presence did not prove a barrier in this class. However, a Web page was established for this class that featured brief student biographies, together with photographs and email address. This helped students to attach faces to the other participants in the virtual community of the class. In addition, students were asked to introduce themselves informally on the listserv at the beginning of the class. A photograph of the instructor was included on the class home page so that students would have a face to connect to this member of the virtual community.

Rheingold reports that, "Some people — many people — don't do well in spontaneous spoken interaction, but turn out to have valuable contributions to make in a conversation in which they have time to think about what to say. These people, who might constitute a significant proportion of the population, can find written communication more authentic than the face-to-face kind. (p. 23)" Indeed, this proved to be true in this class. One student in particular who was reportedly very shy in face-to-face classes became quite loquacious in the virtual community context of the Internet-based class.

Another student reported afterward that he got to know students far better in this class than in person-to-person meetings that took place in on-site classes and other forums. This corresponds to Rheingold's assessment that the Internet is a place where "people often end up revealing themselves far more intimately than they would be inclined to do without the intermediation of screens and pseudonyms. (p. 27)"

Significantly, one thing that greatly appealed to students in this class was the opportunity to get to know — and share an instructional experience with —- students from other regional sites besides there own. One student commented, "This has been a lot of fun, and I've enjoyed this opportunity to take a class with all you midwesterners and get to know some of the other students outside of Oregon." Most of the other classes taught via the distance program that included this Information Design class are taught at regional centers (Portland, OR; Lincoln, NE; Kansas City, MO; Denver, CO; Albuquerque, NM; Sioux City, IA; and Grand Forks, ND), serving students in a single region or state. With the Internet format, students from Emporia, KS and students in the various regional programs all have the opportunity to share the same instructional experiences.

Selective use of outsiders for complementary insights and information

Outsiders were not utilized directly in this class, but outside information came from the textbooks and the wealth of resources available on the Internet. It would be very easy to get input from outsiders in an Internet-based class in the form of guest speakers contributing to the listserv dialogue or student interviews with outside experts via email, telephone, etc. Some assignments for this class featured field trips, which fit within this dimension of Schrage's model.

Collaboration's End

The class ended with the end of the semester. The temporary virtual community dissolved. However, lasting bonds were established. One student who traveled to a city in another state to attend a weekend intensive class reported that students at that location who had been her virtual classmates in the Information Design class were very hospitable, inviting her to stay at their homes and to go out to dinner with them.

It is important to note that while the class no longer exists as a virtual community — collaboration's end — the students still form a community within the graduate program and as a community of professionals. Near the end of the class, one student wrote, "I am assuming that many of us will be raving Web Heads by the end of the class and will be doing all sorts of work in our communities (or for ourselves). It would be nice for us to be able to continue our discussions on the ESU [Emporia State University] listserv that's dedicated to Web talk." As this comment indicates, there are forums for the virtual community of the members of the Information Design class to continue, as part of a larger virtual community. And they seem to have the motivation to do so.

Conclusion

This paper has presented a case study of an Internet-based class that was based around a model of a collaborative virtual community. This class was a test pattern for future courses taught via the Internet. Already revisions have been made in response to what was learned in this class, including more emphasis on deadlines, establishing a comprehensive plan for class implementation at the outset (easier done the second time around!), and increased emphasis on some telephone communication between individual students and the instructor. In Internet-based education, many approaches are possible; it is indeed a powerful and flexible medium for teaching and learning. For an overview of these different approaches, refer to "Internet-based Education: Some Guidelines" (McLellan, 1996b) at the Web site http://tech-head.com/i-ed.htm. As this case study demonstrates, the model of a virtual community, with students interacting dynamically with the content, the technology, and, most importantly, each other, offers a powerful and convivial approach to providing education at a distance.

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"Our Town: An Architectural Perspective": A Program For Inner-city At-risk Children

by Claire B. Gallagher

Abstract

"Our Town: An Architectural Perspective" is a program for at-risk elementary school children in which the neighborhood serves as the classroom and as a vehicle for instruction and the development of community pride and self-worth in the participants. The program provides an alternative educational environment in which students who have difficulty performing in a typical classroom feel welcome and safe. Classes are hands-on and interdisciplinary in nature. Visual and spatial literacy are at the heart of "Our Town"'s educational strategy. This paper will discuss the program and suggest possible ramifications in terms of classroom practice.

Introduction

In the fall of 1992, the "Our Town" program was instituted at Carnegie Mellon University in Pittsburgh, PA. The goal of this effort was to begin a grassroots program introducing built-environment awareness in the public schools. The pilot project was established with a suburban population of fourth grade students. Twenty children, ten girls and ten boys, attended class sessions over a ten week period. These sessions focused on concepts of basic composition, urban design and architecture. There were no prerequisites for inclusion in the classes other than a general interest in the subject of architecture and the ability to pay a nominal course fee. Children worked in a group to explore the components of a town and, subsequently, design a fictitious example. An architect served as the primary facilitator with assistance from educators, teaching assistants from the Department of Architecture of Carnegie Mellon University, and other volunteers. Design of the curriculum was a collaborative effort between the architect and the director of the program.

Based on the success of the pilot project a second program was instituted in an urban neighborhood which included children from a white, blue-collar section of the neighborhood and black children from the "projects" adjacent to the school, which served to separate the two groups of students. This environment represented a "worst case scenario" in that these children had no interaction other than their daily coexistence in school. The challenge became to use the "Our Town" program in this neighborhood and to note any similarities and differences between the outcomes of the suburban and urban student populations.

Methodology - The Design Problem

The exercise began with a discussion of the question "What is a city?" This discussion led to a brainstorming session in which a list of buildings for inclusion in "Our Town". A large-scale topographic map, 7' x 14', was provided for planning the city. This map, drawn on sheets of craft paper which had been taped together, provided the framework for developing the city plan and its infrastructure. Students were given small reproductions of the plan to take home and develop a scenario and general map of the proposed city.

In a subsequent class, the drawings and text were displayed with each student presenting his/her work. A discussion followed in which general concepts for the design of the city were explored. The original list of buildings from the brainstorming exercise was edited and the students agreed upon a basic strategy for designing the city. A role playing exercise provided the vehicle through which to proceed. Issues of zoning, adjacency, and transportation were investigated in this manner. Each building from the general list was written on a 5" x 7" index card and placed on the site map. The students were free to move the cards until all conflicts regarding adjacency and other pertinent issues were resolved. Zoning was established and infrastructure was discussed.

The index cards were fixed in position with tape.

A transition was then made to a larger scale map with dimensions of 21'x42'. This map contained all the elements of the smaller version; it, too, was divided into quadrants. Students began by establishing their building locations on the map and then designed them.

Materials were provided for the models of the buildings. These included assorted cardboard boxes, plastic containers, construction paper, tubes, straws, glitter, wallpaper samples, coffee stirrers, popcicle sticks, fabric, foil, acetate, cardboard, chipboard, paint, markers, glue, clips, fasteners, beads, etc. Students were free to choose from the available materials as they developed their models. Interaction among students was encouraged by the facilitators. Buildings were designed on their "sites" and, when completed, were fixed there. Having designed one building, each student began to design another. This process continued until all buildings were constructed and it was agreed that the town had been completed.

The Suburban Response

By discussing the notion of what a city might be, the class established the concept that a city was "a place where many different people lived together." Further, they established the fact that some people worked in a city but did not live there and needed transportation to and from their jobs.

The students began with the given map and developed a strategy for the design of their city.

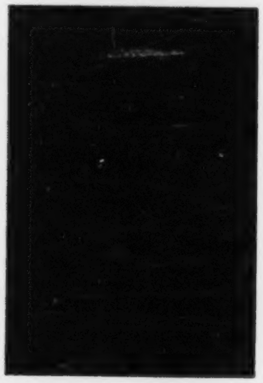
Figure 1
Planning The City

The site map was divided into four quadrants and teams of students were established to develop each section. Five students were assigned to a quadrant. Within each group, assignments for the design of the buildings were negotiated. In all but two cases, it was agreed that the buildings would be developed by individuals, not by teams. The two examples of team projects were the mall and the amusement park.

The larger scale site map was placed on the floor of the Great Hall of the College of Fine Arts Building at Carnegie Mellon University, an impressive, large space. The planning of this city was well considered. A great deal of attention was paid to issues of zoning and adjacency. Interpersonal interactions during the planning process involved a great deal of discussion and compromise. The original building list indicated references to occupations or job sites within the families of the participants (for example, the rehabilitation center) but during the editing process these personal biases were eliminated since the importance and relevance of these buildings was not universal. The remaining buildings, that were designed and placed in their context, were mainly public buildings and recreational facilities with some upscale housing. Transportation was indicated to be via subway and car only with no reference to other means of public transportation. No connections were evident between the two articulated subway stations and the streets for vehicular traffic were drawn timidly, without conviction, and visually appeared as an afterthought. There was a considerable amount of unarticulated open space within the city. During the building design phase, students were unconcerned with the adjacent designs and with the inherent ramifications regarding other buildings. The resulting designs were visually disconnected; their connection remaining one of formal planning only. There was virtually no consideration of context with no site development or landscaping. The individual buildings acted as isolated events in a homogenous space.

Building articulation was extensive but found only on the exterior. Kinetic elements, sophisticated formal relationships of masses (collision of forms, changes in scale, etc.), vibrant signage, and other design strategies were evident in many of the buildings but the interiors were not considered.

Figure 2
The Toy Store



Little evidence of scale or human interaction was discernible. An example of this was the fire station. This building was elevated above street level on columns in order to allow traffic to pass beneath it. No streets were indicated, however. A kinetic drawbridge allowed the firetrucks to get to the street from above. The massing and proportion of the building were very sophisticated. There were no elements of scale. No windows, doors, stairs, or other human elements were included in the design. It was, in fact, an abstraction of a fire station.

Figure 3
The Fire Station

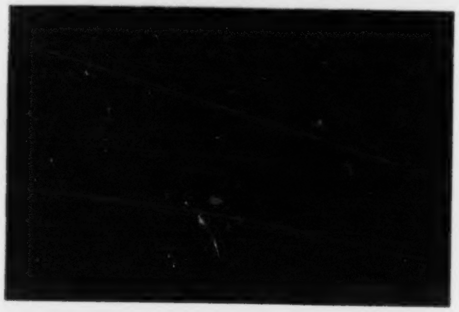
On the final day of the program, family members and friends were invited to visit "Our Town". This open house provided and opportunity for the children to explain their work to others. The overall sense of the visitors was that the children were proud of their creation. They were able to describe their process with clarity and explain the concepts of zoning, planning, and building design through the example of "Our Town".

The Urban Response

The project began with a discussion of what a city was. It was established that a city was a "place" and that many people lived there. A lively discussion followed in which things found in a city were used to describe the term. From this, a continuation of brainstorming produced an extensive list of buildings and places. Many of these elements were recognizable as small scale components of the immediate neighborhood. Housing was discussed and, although high rises were mentioned, single family housing was stipulated as essential. Parks and open space were mentioned repeatedly.

A basic site map was produced by the facilitators and was met with enough resistance to abandon it. A new site map was designed, at full scale (20'x 40') by the students using processes of discussion, conflict, and compromise. It was constructed in the gym and fixed to the floor. Topographic features, rivers, roads, and other organizing factors were drawn directly on the craft paper with black marker (a deliberate choice of the designers).

Figure 4
Laying Out The City



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Once the general map was established, the brainstormed list of elements was edited (little was seen to be irrelevant), the items were written on 5"x7" index cards, and the planning process began. A great deal of compromise was necessary to agree on the locations of major buildings. There was immediate attention to adjacency and the affect of one building on another. The context of each building was discussed at length. Transportation was a specific concern. The bus station was located conveniently for all inhabitants to utilize it. Pedestrian patterns were projected and sidewalks were added. An airport connected the city to the rest of the world. Once the general plan was established, the index cards were fixed to the map in their designated locations. No quadsants were drawn. Other impositions of order were avoided. The students assigned buildings to each other for development without interference from the facilitators. They then began to design and build. Many buildings were designed by teams. In some cases, the teams would remained intact throughout the generation of several buildings, in others, teams would recombine after the initial design was completed. Recombination might occur several times in the course of the project.

Materials were provided in large cardboard boxes placed around the site map. It was common for the students to empty the large boxes of their contents and use them for the basic structure of their buildings. Having designed one building, a student would begin to design another. The process continued until all the buildings were constructed and the students agreed that the town had been completed.

The planning process continued throughout the design of "Our Town". Issues such as access to electrical power became items for discussion and compromise. The effects of the inclusion of such elements became evident in the city. The source of power was established as the basketball hoop. Yarn was attached to the hoop and strung between thread cones that stood adjacent to buildings in the city. In order to be connected to this system, one had to negotiate with the "owners" of the utility who, in turn, would erect a tower and bring the yarn to the building. This discussion was lively and animated.

Landmarks were important in this city. Local elements such as the corner bar, the bakery and barber shop were included in the fabric of "Our Town". The buildings themselves were large in scale. The larger boxes (which had been the containers for other building materials at the outset) became the buildings, or a collection of moderately sized boxes were assembled to form a skyscraper, for example. In general, the scale of the buildings was consistent, although the buildings were out of scale in relation to that of the site map.

Building articulation was extensive both on the exterior and the interior. Every building had open doors and a sense of scale implied by the inclusion of human figures made of cardboard or pipecleaners. Many buildings were personalized in terms of concept and content. An example was a hospital for babies designed by a girl whose sisters had all had children by the age of sixteen. The designer had constructed all of the beds (plastic fruit containers), mattresses (batting and fabric), pillows (batting and fabric), and bedclothes (fabric) and placed them carefully in the building in a specific orientation. The entire site surrounding the hospital was landscaped with flower gardens (egg cartons with paper flowers on pipecleaners in each section), paths for walking and areas for parking.

Figure 5
The Hospital For Babies

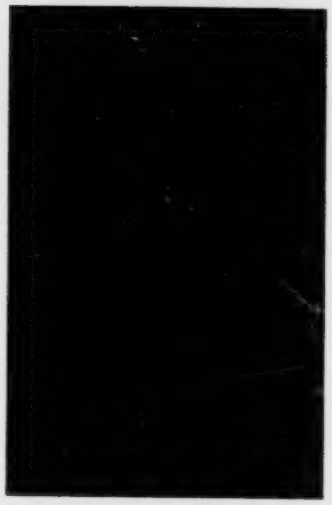
The bus connected other parts of the city to the hospital. An elaborate scenario was embedded in this project. Its designer was proud of her design and would describe it in detail if questioned.

Another example of personalized projects was the middle school. The boy who designed it spent the first few classes accusing everyone of hating him and threatening him. He would not work in the group and sat alone on a bench against the wall of the gym. Facilitators sat with him on his bench and encouraged him to become a part of the design process. After several attempts at inclusion, the boy showed an interest in designing the school. His design was large in scale with a fully open facade that revealed all the elements of a traditional school: chalkboard, desks with chairs in rows, teacher's desk, book shelves, a globe, etc. Lighting was provided through clerestory windows located in a sophisticated roof structure that was folded and fastened to form a unique shape. He named the school after himself and added the name of his architect "teacher".

Figure 6
The Middle School

An element of competition was evident in the two skyscrapers in "Our Town". Two teams were trying to build the tallest one. Trial and error regarding structural issues of height and proportion led to two different, but successful, designs for tall buildings. There were several failures before the design was perfected and each tower was limited by its base to height ratio. At the conclusion of the project, however, the designers demonstrated an understanding of the concepts embedded in the design of a tower.

Figure 7
The Winning Skyscraper



The design process continued until the site map was full of elements, the list of buildings had been addressed, and the class agreed that the city was complete. A document was produced by the children in which they described their process through a series of images (drawn manually and with the aid of a computer) and text. The students were responsible for choosing the content and formatting the document. The last class meeting was in the form of an open house during which time the students could explain their work to friends and family. Descriptions included walks around "Our Town" (shoes were removed at the request of the students) and the recounting of the scenarios that served as points of departure for the designs. The printed document was distributed at this time.

What the Children's Designs Tell Us

The strength of this educational strategy with at-risk populations is evident in the work of the children from the "Our Town" project. There are some compelling arguments for the use of visual and spatial instruction with inner-city children. Some of the differences in the process and products of the two populations of children in this study are obvious. For educators these differences have direct implications in terms of classroom practice.

The typical means of instruction in our educational culture is either linguistic and/or mathematical. Rarely is any attention paid to visual or spatial thinking or problem-solving. The "Our Town" project demonstrates an example of the latter in which children are given the freedom to design and build an environment of their own. For the suburban children in this study this was fantasy, a game. For the urban children this was real life, a chance to role play and control an environment, albeit imaginary, which is an unusual condition for them to experience. For them it was problem solving of the highest order. From the beginning of the exercise the suburban children accepted the parameters of the problem as given by the facilitators. The urban children did not, taking control from the outset. They worked as a team to design their city while the suburban children insisted on working alone. The urban example demonstrated a working knowledge of the concept of community and its connection with the classroom while the suburban example illustrated the common classroom emphasis on individuality, invention and product. The process in the urban "Our Town" project was revealing as a natural example of cooperative learning. It had a life of its own.

Developing a curriculum around these classroom strengths could serve as a springboard to other content areas. The possible implications of this are numerous but the success of this approach, especially with urban children, would indicate the usefulness of the integration of visual and spatial thinking and problem-solving with at-risk populations. Architecture, by its nature, is interdisciplinary and would be an appropriate choice for a theme for such a curriculum. This, of course, poses tremendous challenges for educators but the potential is there to address a motivational and educational issue in real terms. Perhaps, in this way, at-risk children such as these could be sent a different message than they typically hear in the classroom: one of strength, hopefulness, and success.

Epilogue

The "Our Town" project has been expanded to four phases. These take place over the course of a year and can briefly be described as follows:

Phase One: Designing "Our Town"

Phase Two: Landmarks Past and Present
Students document their neighborhood in drawings, models, and interviews of long-time residents to uncover the history of the neighborhood. The concept of landmarks is used as the point of departure for this phase.

Phase Three: Neighborhood Intervention
Students compare the findings from Phases Two and One. Differences between the ideal and the real conditions of the neighborhood are discussed and possible solutions are proposed. Students work in teams to identify needs and design interventions for sites in the neighborhood. These ideas are presented to neighborhood organizations, residents, potential project funders, the mayor and other elected officials, and the community at-large. A project is chosen from among the submissions based on design and feasibility.

Phase Four: Implementation of the Design
With the help of community members, educators, local organizations, architects, landscape architects, and others the students build the chosen community intervention. This final phase has resulted in a new community park in one Pittsburgh neighborhood complete with landscaping, street furniture and lighting, and a new sidewalk with the names of those who helped inscribed in ceramic panels set into the concrete. The lesson to be learned is profound: a small group of children made something very important happen. Their neighborhood helped them become part of the process and they have improved their neighborhood. "Our Town" provides a compelling example of the neighborhood as classroom and for the use of visual and spatial thinking and problem solving as the vehicle for instruction with at-risk children.

The Effects Of Dubbing Versus Subtitling Of Television Program

by Fattawi B. Mokhtar

Abstract

The knowledge of program content among viewers who watched an instructional television program translated into several translation modes and under different viewing fashions was investigated. One hundred seventy six college students were randomly selected and randomly assigned into eight experimental groups. A 4 x 2 factorial design was employed. The dependent variable was the viewers' scores on multiple-choice comprehension test questions on the program content administered immediately after treatments. Several significant differences among variables were found and discussed.

Introduction

When language becomes a barrier to communication, the classic alternative solution to this problem is translation. There are two modes of translating television programs. First is a translation process known as "dubbing." With this method, every spoken word, including voice-over narration as usually employed in instructional programs, is translated into the target language.

The second mode of translation is a process known as "subtitling." With this method, spoken words, either in dialogues, monologues (on-camera voices) or voice-over narrations, are translated and presented in the form of text superimposed on the visual, typically at the bottom part of the screen. Hence, with this method the dominant meaningful symbols are presented in visual form while the non-meaningful spoken words remain as auditory symbols.

In many non-English speaking countries, translated broadcast materials, either for entertainment or instructional purposes, constitute a great if not dominant portion of the overall number of mediated resources in those particular countries. Translation of imported programs is a viable effort to overcome the problem of high cost versus limited audience for local production (Kilborn 1989).

Statement of the Problem

Translation by dubbing or subtitling seems to impose several new characteristics on the product of this process. There are several questions related to these characteristics which need to be addressed, particularly from the communication process point of view. When a program is translated in subtitles, it automatically changes the conveyance of information from auditory dominance to visual dominance (d'Ydewalle et al. 1991). With translation by dubbing, the translation maintains the original method of communication used by television.

With translation in subtitles and in dubbing then, the television medium tends to communicate in two different fashions: with visual dominance in the former and auditory dominance in the latter. Whether these differences affect viewers' comprehension of the program content is unknown at this point.

Technically, translation by subtitles will preserve all audio signals in the original soundtrack (including music, sound effects, and spoken words) exactly as in the original production. Aesthetically, this is one of the major advantages of subtitles over dubbing (Voge 1977). However, when considering the communication process, the spoken words (in the original language) are turned into non-meaningful symbols. The role of these symbols during viewing is not yet understood.

If Schram's Communication Model is used as a theoretical ground, those non-meaningful spoken words will be categorized as "noise," which according to the model will impede the communication process (Schram 1954 in Heinich et al. 1989). An investigation involving retention and elimination of the soundtrack in subtitled television might answer this question.

Another form of written text on television is the "caption." Captions and subtitles are identical in physical format and in the way they are presented on the screen. They are different, though, in the sense that captions use the same language as the soundtrack, whereas subtitles are presented in a different language. Several studies on the effects of captioned television on learning among hearing-impaired and normal-hearing viewers indicate that captioned television improves learning significantly (Neuman 1991, Markham 1989, Koskinen 1988, Bean 1989). Whether subtitled television affects comprehension and learning as consistently as captioned television is unknown at this point.

Purpose of the Study

The purpose of this study was to investigate viewers' knowledge of program content under various television translation modes and viewing experiences. The researcher was interested in investigating whether there were any differences in the knowledge of program content among viewers who watched an instructional television program that was translated in several translation modes and variations, those who watched the program translated, and those who saw the same program without translation.

The researcher was also interested to investigate whether there were any differences in the knowledge of program content among viewers who watched those translated and not translated programs under single viewing condition to those who saw the same, but under repeated viewing condition.

Research Hypotheses

This study advanced the following hypotheses:

Hypothesis 1. There is a significant difference in the knowledge of program content between viewers who viewed an instructional television program with translation and those who saw the same program without translation.

Hypothesis 2. There is a significant difference in the knowledge of program content among viewers who viewed an instructional television program with different treatments of translation by dubbing or subtitling.

Hypothesis 3. There is a significant difference in the knowledge of program content between viewers who viewed a television program in a single viewing experience and those who viewed the same program in a repeated viewing experience.

Hypothesis 4. There are significant interactions between modes of translation (dubbing or subtitles) in an instructional television program and viewing experiences.

Methods

Research Design

A 4 x 2 factorial design with random selection and random assignment was employed in this study (Keppel 1991). Translation modes were the first independent variable (Factor A), with four levels: dubbing (a1); subtitles with sound (a2); subtitles without sound (a3); and without translation (a4).

The second independent variable (Factor B) was the viewing experience with two levels: single viewing (b1) and repeated viewing (b2).

The dependent variable was the viewers' scores on multiple-choice comprehension test questions on the program content. This test was administered immediately after treatments. Each mean cell and the main effects were compared to test the hypotheses. When there was significant difference, post hoc tests were conducted to pinpoint where the difference was.

Subjects

One hundred seventy six students from the Center for Matriculation Program, Universiti Sains Malaysia in Penang, Malaysia, were selected as the subjects in this study. They were randomly selected and randomly assigned into eight experimental groups. Each group consisted of twenty-two subjects.

Because of the nature of selection criteria to enroll in this program and the rigidness of the program itself, matriculation students are highly homogenous in terms of their academic backgrounds and age levels.

Instrumentation

Discussions on instrumentation are presented in two sections. The first section is on the materials, in this case the translated instructional television programs where the independent variables were manipulated. The second section is on the comprehension test questions in which the dependent variable was measured.

The materials

The Spanish version of an instructional television program entitled Cardio Pulmonary Resuscitation (CPR) For Bystanders (revised), produced by Pyramid Film and Video (1992) was chosen for this study. The English version of the program was not chosen because English is the second language in Malaysia. Narrations and other on-camera voices in the original soundtrack might to a certain degree have been understood by the viewers. Hence, this effect was a potentially confounding variable for the subtitled version of the instrument. Besides language, the choice was also based on the following criteria:

i) The length of the program was not more than 30 minutes.

ii) The program content was something of which the researcher believes the subjects have some basic entry-level knowledge, but no knowledge in detail.

iii) The program was produced in a typical documentary fashion where verbal modalities such as voice-over narrations and on-camera voices dominate the conveyance of the messages.

iv) The overall program content was something believed to be meaningful or at least stimulating to a subject's interest.

v) Subjects in this study were within the scope of the intended audience specified in the program.

Upon receipt of permission of the copyright owner, the program was duplicated and translated into Malay using two modes of translation, dubbing and subtitling. The translation was based on the original soundtrack in English.

For the program translated in dubbing, the voice-over was narrated by a semi-professional narrator. On-camera voices were spoken by amateur actors and actresses. Original sound effects and music were reused whenever possible.

For the program translated in subtitles, a character generator machine was used. The lettering was Futura regular in 36 point size. Kemp et al. (1985) notes that for recognized legibility standards for ease of reading, the letter size should be at least one twenty-fifth the height of the screen. On a 23-inch television monitor with 15 inches of screen height, 36 point Futura satisfied this requirement. The lettering was in white and bordered in black. A maximum of 2 lines with 2 inches of margins on each side and a minumum of 2 inches of bottom space were uniformly employed.

The exact translation used in the dubbing was used in subtitles. The text was not summarized as is usually done in the subtitling of feature programs.

To see the placebo effects, the original version in Spanish without translation was used. For the subtitles without sound condition variable, the same subtitled version was used, but played in mute.

All versions of the program, including the original without translation, were recorded on half-inch Sony high-grade VHS tape in PAL color system.

The comprehension test questions

All questions were developed by the researcher based on the program content conveyed through both channels (audio and video) as a whole. To ensure content validity and precise wordings on the questions, the printed CPR procedures written by the American National Red Cross (1978), Feldman et al. (1975) and Seymour (1981) were reviewed. After a series of pilot test, the final version of the 35 comprehension questions was translated into the Malay language. The reliability of the comprehension questions was determined to be .79 by the Cronbach Alpha technique computed by SPSS-X program.

Experimental Procedures

All viewings were carried out in the projection room. The 60-person capacity room has semi-permanent seats and was equipped with two 23-inch television monitors, a VCR, and several other facilities for projection. The acoustic and ambient light controls of the room were adequate. The temperature was controlled by means of three window-type air conditioning systems.

For the purpose of this study, only 44 seats were allocated. Two 23-inch television monitors were set up to ensure that all viewers were seated no further than the maximum distance suggested. Heinich et al. suggested that one 23-inch television monitor should serve no more than thirty students (Heinich et al. 1989). Hence, for 44 viewers, two 23-inch monitors were more than generous. The seating distance and the angle of viewing were also set in accordance to Heinich's suggestions.

The experiment sessions were held on four consecutive evenings. All seats were numbered from 1 to 44. All set-ups were readied at least thirty minutes before sessions were to begin.

Experiment Implementation

Randomly chosen subjects were ramdomly assigned into 4 groups of 44 subjects each. Minutes before the session was to begin on the day of the experiment a representative of the group in that particular session drew to determine on which version of the program the group would be tested. Immediately after viewing, the comprehension test was administered to all subjects in the group. The subjects were instructed to answer by circling the correct responses on the question paper itself. They were given 30 minutes to complete the test. At the end of the 30 minutes, all subjects were asked to stop. One representative of the group drew to determine whether subjects seated in odd numbered or even numbered chairs would stay for a repeated viewing. Students seated in unselected numbers were asked to hand in their comprehension test answers and leave the room.

The remaining subjects would be in a repeated viewing condition. A brief explanation was given on this viewing condition. They were requested not to change their seats. The program was then shown for the second viewing. The subjects were told that they could answer the questions while in the second viewing if they wished. Upon completion of the second viewing, the subjects were given another 10 minutes to complete the test. The exact same procedures were repeated in every session. In the subtitles without sound condition, the same subtitled version of the program was used, but shown in mute. All sessions were conducted by the researcher himself without any assistance.

Results

Data were analyzed using Two-Way Analysis of Variance (ANOVA), One-Way Analysis of Variance (ANOVA) and t-Tests to test the hypotheses. The alpha level was set at .05. When there was significant difference between the means, Tukey test procedures were conducted to pinpoint where the difference was.

Single Viewing

The descriptive statistics in Figure 1 revealed that under the single viewing experience condition, students who viewed the program without translation had the lowest score (Mean = 16.45, SD = 3.5). Analysis of variance (ANOVA) tests and statistical tests using Tukey test procedures indicated that this treatment was significantly different than the other three treatments at p = .000 level (ANOVA) and p <.05 level (Tukey).

Figure 1
DESCRIPTIVE STATISTICS FOR TRANSLATION MODES AND VIEWING EXPERIENCE

VIEWING EXP.		TRANSLATION MODES			
		Dubbing	Subtitle +Sound	Subtitle - Sound	No Trans
Single	Mean	22.36	21.23	22.50	16.45
	SD	3.1	3.2	3.0	3.5
	n	22	22	22	22
Rep.	Mean	29.68	25.77	27.91	18.55
	SD	1.6	2.4	1.9	3.1
	n	22	22	22	22
TOT.	Mean	26.02	23.50	25.20	17.50
	SD	4.4	3.6	3.7	3.4
	n	44	44	44	44

The students in subtitles without sound treatment had the highest mean score (Mean = 22.50, SD = 3.0). Statistical tests however, indicated that there were no significant differences between this treatment, the dubbing treatment (Mean = 22.36, SD 3.1), and subtitles with sound treatment (Mean = 21.36, SD = 3.2) at p <.05 level. Pairs of treatments which significantly differed under single viewing conditions are shown in Figure 2.

Figure 2
PAIRS OF MEANS UNDER SINGLE VIEWING WHICH ARE SIGNIFICANTLY DIFFERENT

	Dub.	Subtitle + Sound	Subtitle - Sound	No Trans.
Dub.				*
Subtitle + Sound				*
Subtitle - Sound				*

* p < .05

Repeated Viewing

In the repeated viewing condition, students viewing the without translation treatment again had the lowest mean score (Mean = 18.55, SD = 3.1). Dubbing treatment (Mean = 29.68, SD = 1.6) appeared to be the best of the three translation modes. Statistical tests using Tukey test procedures indicated that under this viewing condition, without translation treatment was significantly different than all other treatments. Subtitles with sound treatment (Mean = 25.77, SD = 2.4) was significantly different than subtitles without sound treatment (Mean = 27.91, SD = 1.9) . Also significantly different from subtitles with sound treatment was dubbing treatment (Mean = 29.68, SD = 1.6). Surprisingly, however, subtitles without sound treatment (Mean = 27.91, SD = 1.9) was not significantly different than dubbing treatment (Mean = 29.68, SD = 1.6). Pairs of treatments under repeated viewing conditions which significantly differed from each other are shown in Figure 3. Data analysis using Two-Way Analysis of Variance (ANOVA) indicated that interaction between translation and viewing was significant at p = .000 level. Further examination of the cell means revealed that the mean score of translation modes treatment under single viewing conditions changed inconsistently under repeated viewing conditions. This appeared to indicate that an interaction between translation modes and viewing experiences was truly present.

Figure 3
PAIRS OF MEANS UNDER REPEATED VIEWING WHICH ARE SIGNIFICANTLY DIFFERENT

	Dub.	Subtitle + Sound	Subtitle - Sound	No Trans.
Dub.		*		*
Subtitle + Sound				*
Subtitle - Sound		*		*

* p < .05

Tests of Hypotheses

All hypotheses were tested using Two-Way Analysis of Variance (ANOVA), One-Way Analysis of Variance (ANOVA), and t-Tests. The alpha level was set at p < .05. When there was significant difference between the means, the Tukey test procedure was used to pinpoint where the difference was.

Hypothesis 4. There are significant interactions between modes of translation in instructional television programs and viewing experiences. H4 was tested first because the outcome of the hypotheses on interaction will have a strong implication on the testing procedure of the other hypotheses (Keppel 1991). Analysis of Variance (ANOVA) revealed that the interaction between translation and viewing was significant $F(3, 168) = 6.429$, $p = .000$. H4 therefore was accepted.

Hypothesis 1. There is a significant difference in the knowledge of program content between students who viewed an instructional television program with any modes or variations of translation compared to students who viewed the same program without translation.

Figure 4
ANALYSIS OF VARIANCE SUMMARY TABLE

Source	SS	DF	MS	F	Sig. F
Translation (T)	1957.295	3	652.432	81.08	.000*
Viewing (V)	1031.114	1	1031.114	128.144	.000*
T x V Interac.	152.205	3	51.735	6.429	.000*
Explained	3134.614	7	449.088	55.811	
Residual	1351.818	168	8.047		
Total	4495.432	175	25.688		

*$p < .05$

Analysis of variance (ANOVA) revealed that the translation's main effect was significant $F(3, 168) = 81.082$, $p = .000$. However, because the interaction between translation modes and viewing experiences (H4) was significant ($p = .000$), a judgment based on the translation's main effect alone is not sufficient. All translation cell means under both viewing experience conditions should be examined and tested.

Two single-factor (one-way) analyses of variance (ANOVA) were conducted. The analysis indicated that at least one translation mode is significantly different than the others $F(3, 87) = 16.89$, $p = .0000$. Tukey test procedures were conducted to pinpoint where the significant difference was. The outcome of the Tukey test procedure indicated that the without-translation mode condition was significantly different than all other modes and variations of translation conditions at $p < .05$ level. Another one-way ANOVA to test the mean of translation modes under repeated viewing conditions was conducted. Again, the analysis indicated that at least one translation mode was significantly different than the others $F(3, 87) = 94.83$, $p = .0000$. The outcome of Tukey test procedures indicated that the without-translation mode was significantly different than all other translation modes at $p < .05$ level. Hence hypothesis 1 was accepted.

Hypothesis 2. There is a significant difference in the knowledge of program content among students who viewed an instructional television program with translation in different modes and variations.

Figure 5
ONE-WAY ANOVA (SINGLE VIEWING)

Source	SS	DF	MS	F	Sig. F
Between Group	534.45	3	178.15	16.89	.000*
Within Group	885.90	84	10.54		
Total	1420.36	87			

*$p < .05$

The same analysis and test mentioned in the testing of H1 were used to test this hypothesis. The conclusion, however, was rather open-ended. Under single viewing conditions, Tukey test procedures indicated that none of the three translation modes, (i.e. dubbing, subtitles with sound and subtitles without sound) were significantly different than each other at $p < .05$ level. Hence, under single viewing conditions, H2 was rejected.

Figure 6
ONE-WAY ANOVA (REPEATED VIEWING)

Source	SS	DF	MS	F	Sig. F
Between Group	1578.04	3	526.01	94.83	.000*
Within Group	465.90	84	5.54		
Total	2043.95	87			

*$p < .05$

A contrasting result was found under repeated viewing conditions. The Tukey test procedures indicated that subtitles with sound was significantly different than dubbing and subtitles without sound at $p < .05$ level. Hence, under repeated viewing condition, H2 was accepted.

Hypothesis 3. There is a significant difference in the knowledge of program content between students who viewed a television program in a single viewing experience and those who viewed the same program in a repeated viewing experience. Analysis of Variance (ANOVA) revealed that the viewing main effect was significant $F(1, 168) = 128.144$, $p = .000$. However, since interaction between viewing experiences and translation modes was significant, further analysis was needed before a conclusion on this hypothesis could be drawn.

Four t-Tests with Independent Samples were conducted. Group means of each translation mode treatment under single viewing conditions were compared with the group means of the same translation mode treatment under repeated viewing conditions. Group means of without translation under single viewing conditions were also compared to means of without translation under repeated viewing conditions.

All t-Test results supported the hypothesis that repeated viewing conditions were indeed significantly different than single viewing ($p < .05$) regardless of the translation modes. H3 therefore was accepted.

Discussion and Conclusion on the Findings

Hypothesis 1

The first hypothesis was developed in relation to the question of whether or not translations would make any difference on viewers' comprehension of the program content.

As expected, students who viewed the program without translation obtained significantly lower mean scores on the multiple-choice test compared to students who viewed the same program in translations, both under single and repeated viewing conditions. This phenomenon can be comprehended by understanding that television is a dual-sensory medium. Part of the information is conveyed through visual channels andthe rest are through auditory channels. Visual channels utilize visual symbols (in this case, scenes demonstrating the CPR procedures), while auditory channels utilize spoken words (in this case the narration and dialogues giving the details about CPR). In the process of interpreting each symbol in television, viewers switched back and forth between the two channels (Findhal 1971) to decode the message. If the symbols were within both the sender's and the receiver's field of experience (Schramn 1954 in Heinich et al. 1989), the symbols could be decoded. When the symbols were successfully decoded, communication was successful. In other words, the message was understood. In the situation of viewing a program where the auditory channel was full of symbols which were not within the viewer's field of experience (i.e., unknown words in the program without translation), the message in the auditory channels could not be decoded. Hence, communication through auditory channels did not occur. Viewers were forced to depend upon only one channel, the visual channel. Messages in words were not recieved by the viewers, meaning they missed part of the program content.

It is concluded, therefore, that viewers acquired the least amount of knowledge on the program content when viewing an instructional television program produced in a foreign language without translation compared to when viewing the same program with translation.

Hypothesis 2

The second hypothesis was developed to test whether dubbing, subtitles with sound, and subtitles without sound, affects viewers' comprehension of program content differently. The mean scores of students who viewed the program under those three conditions were compared. Two-Way Analysis of Variance procedures indicated that translation's main effects were significant. At the same time however, interaction between translation modes and viewing experience was also significant. Further analysis was conducted. Two separate One-Way Analyses of Variance for translation modes under single viewing and repeated viewing yielded two different results. Under single viewing, no significant differences were found between the three modes of translation. Under repeated viewing, dubbing and subtitles without sound were also not significantly different. However, under repeated viewing conditions, subtitles with sound was significantly different than dubbing and subtitles without sound. The mean scores of the students in subtitles with sound were significantly lower.

As mentioned in the Statement of the Problem section, translation by subtitles will preserve all audio signals, including music, sound effects, and spoken words, exactly as in the original production. However, when considering the communication process, the spoken words in the original language were turned into non-meaningful symbols. According to Schramn (1954 in Heinich et al. 1989), those non-meaningful symbols were categorized as "noise" which would impede the communication process. There was some indication that Schram's theory was true, as shown in the descriptive statistics where the mean score for subtitles with sound was 21.23, while the mean score for subtitles without sound was 22.50 (a difference of 1.27). The standard deviation for the subtitles with sound was 3.2, while the standard deviation for subtitles without sound was 3.0, which indicates that students in subtitles without sound had scores closer to the mean than the students in subtitles with sound. Subtitles with sound was also compared to dubbing to test the prediction that the message transmitted in visual channels and the message transmitted in audio channels would probably affect viewers differently. The mean score for dubbing was 22.36 (a difference of 1.13). Hence, there were indications that the prediction was true. Unfortunately, however, those predictions were not supported by the statistical test that showed the significance of the differences. Under repeated viewing, the differences between dubbing and subtitles without sound remained insignificant. Subtitles with sound, however, was significantly different than dubbing and subtitles without sound. The effects of second viewing seem to be more prominent on dubbing and subtitles without sound than on subtitles with sound. Under single viewing, the mean scores for dubbing and subtitles without sound were 22.36 and 22.50 respectively. Under repeated viewing, the mean score for dubbing was 29.68, an increment of 7.32. The mean score for subtitles without sound was 27.91, an incremenet of 5.41. Under single viewing, the mean score for subtitles with sound was 21.23, and under repeated viewing was 25.82, an increment of 4.59. It was obvious that the increments of the mean scores of students in dubbing and subtitles without sound were more than the increment of the mean score of students in subtitles with sound. Also, the standard deviations for dubbing and subtitles without sound were 1.6 and 1.9 respectively, while the standard deviation for subtitles with sound was 2.4. The possible reasons for the differences in mean scores and standard deviations in subtitles without sound and subtitles with sound were due to the absence and the presence of "noise" in these two modes of translation.

In subtitles without sound, the effects of second viewing and the absence of "noise" probably enabled the students to concentrate more and to better comprehend the program content. The same effects could be noticed in dubbing translation, where "noise" was also absent. Although dubbing translation employed visual and auditory channels simultaneously in communication, while subtitles without sound employed only visual channels, both translation modes appeared to have statistically equal effects under single viewing and repeated viewing.

In subtitles with sound, the effects of second viewing were present but at the same time, the effects of "noise" were also present. The "noise" acted as a kind of an obstacle during viewing. As a result, the increment of the mean scores of students in this translation mode was

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lower compared to the increment of the mean score of students in subtitles without sound. The "potential difference" between subtitles with sound and the other translation modes, which was not statistically significant under single viewing conditions appeared to be statistically significant under repeated viewing.

The fact that there was no significant difference between dubbing and subtitles without sound was indeed an unexpected finding. In principle, comparison between dubbing and subtitles without sound could be equivalent to a comparison between simultaneous audio and visual stimulants versus visual stimulants only. Earlier studies in this domain (Hoban and Van Omer 1950, Travers 1964, Findhal 1971, Reese 1983, Baggett and Ehrenfeucht 1983, Pezdek and Steven 1984, Drew and Grime 1987) supported the belief that both visual and audio channels working together were much more effective than either one alone. In fact, this was part of the theoretical ground upon which the second hypothesis in this study was built. Particular investigations into those earlier studies, however, revealed that none of the conditions used in those studies which represented visual stimulants only were identical to the subtitles without sound condition used in this study. Any discrepancy in results between earlier studies and this study might be associated with this aspect of dissimilarity.

It is concluded, therefore, that under single viewings of translated instructional television, translation modes did not contribute to any differences in the knowledge of program content among viewers. However, under repeated viewings, this study indicated that translation in dubbing and subtitles without sound helped viewers to acquire more knowledge on the program content than translation in subtitles with sound.

Hypothesis 3

The third hypothesis was developed to test whether single (one-time) viewings would make any difference in the knowledge of program content as compared to repeated (two-time) viewings. Data analyses indicate that single viewings were significantly different than repeated viewings, which appeared to be superior to single viewing.

Further investigation of the interaction between viewings and translation modes, however, revealed that the effects of repeated viewings, were particularly prominent on the program translated in dubbing and subtitles without sound. Results indicating a significant difference between single viewings and repeated viewings were not unexpected. Earlier studies on the effects of repetition yielded similar results (Ash and Jaspen 1953, Kendler, Cook and Kendler 1956, Cook 1960, Garza 1991).

The program used in this study was 30 minutes long. After the first viewing, the subjects were given the first chance to answer the comprehension questions. Since they were not told previously that they would be given a second viewing, they probably tried their best to complete the test after the first viewing. When they were given the second viewing they seemed to pay even more attention to the program. Saturation effects seem to have not occurred with that sequence and length of viewing.

In conclusion, repeated viewings seemed to significantly help viewers to acquire more knowledge on the program content than single viewings. However, the effects of repeated viewings were not consistent in all translation modes. It was equally prominent on the program translated in dubbing and in subtitles without sound, less prominent on the programtranslated in subtitles with sound, and least prominent on the program without translation.

Hypothesis 4

The final hypothesis was developed to see the interactions between translation modes and viewing experiences. Statistical procedures indicated that the interactions between the two factors were significant. Since there were no earlier studies mentioning interaction between viewings and translation modes, no references to earlier studies could be made.

Discussion and conclusions related to the interaction effects between translation modes and viewing experiences were combined with the discussion on hypotheses 2 and 3. Hence, they are not presented again here.

Language barrier in the use of foreign-produced instructional media is a universal problem, particularly among non English speaking countries. Instructional media practitioners, as well as scholars especially in the countries concerned, should investigate and address this problem more seriously. Technological advances in electronics and atmospheric exploitation only helps human to overcome the geographical barriers and distance in communication, but not to language. It seems, due to the language barrier, McLuhan's dreamed global village is yet a reality.

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Questing Toward Cohesion: Connecting Advertisements And Classroom Reading Through Visual Literacy

by Ann Watts Pailliotet

Abstract

This article has four purposes. First, it offers a rationale for connecting students' communication experiences in and out of classrooms to foster relevant literacies needed in contemporary society. Second, it shows how print advertisements and academic print texts share content, structural elements, and reader/viewer processes. Third, it details a method for analyzing print advertisements and academic content area texts. Last, it offers 22 instructional practices to foster cohesive literacy strategies and relevant understandings for students and educators.

Questing Toward Cohesion: Why We Should Connect Commercials and Content Area Reading in Our Classrooms

Although literacy development occurs in interdependent social systems that transcend classroom barriers (Emig, 1983; McLuhan & McLuhan, 1988), students and teachers often see schools and society as separate communicational worlds (Bianculli, 1992; Pope, 1993). Many educators still teach content area reading using only traditional print texts, ignoring mass media, and divorcing instruction from larger social contexts. But modern literacy is no longer a matter of comprehending only the printed or spoken word. Individuals must also be able to understand and critically analyze sophisticated visual information in films, videos, textbooks, computer environments, magazines, television, and life settings, as well as in academic texts.

Students come to our classrooms with rich background knowledge gained from varied communicational experiences. The average high school student has spent more time watching television than in school (Lutz,1989) and countless hours viewing films, videos, magazines, computer games, comics, art, and billboards. Students are also continually exposed to electronic and print commercial advertisements. Ignoring these social experiences is counterproductive to literacy learning. Effective literacy instruction (Reutzel & Cooter, 1992) and content area reading (Vacca, Vacca & Gove, 1996) build on students' background knowledge, gained in classrooms and outside of them. Since teachers (and students) bring a wealth of background knowledge about mass media to academic settings, it makes sense to build upon this knowledge and connect it to classroom literacy learning.

Connecting visual and print literacies in the classroom bridges distances in students' experiences, because all literacies are complementary and interdependent (Neuman, 1991). Visual and print texts share many common structural elements like signification (Bopry, 1994; Saint-Martin, 1990), use of images (Pettersson, 1992), textual patterns and levels of meaning (Herber & Herber, 1993; Kervin, 1985) and rhetorical devices (Ohlgren & Berk, 1977) which convey explicit and tacit ideologies (Althusser, 1986; Giroux, 1993). When a person "reads" mass media, s/he is also engaging in many processes that parallel those required to understand print text, like previewing, metacognitive decision-making, and active response. Processes of visual literacy reinforce (Lusted, 1991) and extend traditional print reading and writing skills (Sinatra, 1986), support current theories like whole language (Fehlman, 1996), further literacy pedagogy (Kellner, 1988; Witkin, 1994), and foster critical thinking (Semali, 1994).

This article identifies common literacy principles, textual structures, and reader processes that print advertisements and content area texts share. Next, it explains an analytic method called Deep Viewing that can be applied to both types of texts. Last, it offers 22 additional classroom activities to connect and extend students' literacies.

When students are able to articulate and apply literacy strategies shared by diverse media and situations, learning becomes more relevant. Pairing print advertisements with content reading bridges experiences in classrooms and society (Considine & Haley, 1992), assisting individuals to develop useful literacy skills and create critical, cohesive understandings of contemporary communication.

Common Principles, Content and Literacy Processes of Popular and Classroom Texts

Researchers, theorists, and practitioners in fields of reading, literacy development, composition, literary response, and communications identify many principles, textual structures, and literacy processes that all modern texts share. These are described next.

Common Principles

Many forms of communication are worthy of study and analysis. These include oral, electronic, and popular texts, as well as cultural events.

- The reader/viewer is not a passive recipient of information but actively engages in transactions with a text to create meaning.
- Many meanings are possible as readers/ viewers interact with texts and construct meaning from them. There are levels of understanding from explicit and literal to implicit/interpretative and applied.
- Understanding texts is a recursive and ongoing process, not linear or static. These understandings are developed through past and present experiences and *not* developed in isolation, but arise within social contexts.
- Literacy environments in and out of school are intimately linked and interdependent.
- Textual understandings involve many human responses including emotions, intellect and metacognitive awareness, the ability to know and apply various strategies
- Strategies and understandings developed in one form of communication interact with and support others. Reading, writing, speaking, listening *and* viewing are interdependent.
- All forms of media arise within specific cultures or ideologies. Analysis of media may be used to promote multicultural awareness and critical thinking.
- Rhetorical analyses of textual elements like audience, narratives, or context may be used to promote understandings in all forms of media.

Common Textual Structures, Elements and Content

All texts -- whether print, electronic, or situational -- share common elements, including genres, plots and structures , images and metaphors , and the use of signs and symbols. Students encounter the following shared **content** in commercials and content area texts:

- Sequencing
- Imagery
- Expository textual patterns
- Persuasive techniques
- Narrative structures
- Textual patterns of organization
- Cultural biases in illustrations and text
- Information
- Introduction of new langauge or vocabulary
- Fact vs. opinion
- Paragraph structure
- Attention devices like bold print, use of spacing, and color
- Illustrations
- Word choice of verbs, adjectives, nouns ,etc.
- Organizational elements like headings, titles, sections
- Graphs and charts
- Sentence structure and grammar
- Textual evidence
- Omissions of content or ideas
- Implicit/explicit themes and values
- Superordinate and subordinate ideas
- Rhetorical structures and devices
- Point of view
- Construction of explicit and implicit themes through language and imagery
- Use of qualifying statements
- Use of statistics and numerical references
- Use of jargon that evokes specific cultural discourses
- Illustrations, art and other visual information

Common Literacy Processes

Many literacy skills and processes are needed to understand any text. Students engage in the following **processes** when they read commercials and content area texts:

- Previewing
- Skimming
- Activating schema
- Drawing on background knowledge and prior understandings
- Making choices about the importance

and veracity of information

- Observing textual elements
- Sorting and Selecting
- Retaining and Remembering
- Analyzing and Evaluating
- Identifying levels of meaning
- Reading explicit information and subtexts
- Employing guiding questions
- Identifying themes
- Looking for biases
- Identifying and analyzing arguments
- Recalling, retelling, remembering
- Comparing and contrasting
- Identifying and citing textual evidence
- Distinguishing among superordinate and subordinate ideas
- Recognizing and expressing personal response
- Critically analyzing rhetorical devices
- Using multiple modalities to understand meanings and articulate responses to them
- Using graphic organizers to structure information (e.g. venn diagrams, semantic webbing, intersected lists, herringbones, etc)
- Metacognition: Employing varied comprehension strategies
- Comprehending unfamiliar words
- Learning new vocabulary
- Distinguishing among fact and fiction
- Noting missing information
- Responding through visual, written, and oral means

The Deep Viewing Process: Connecting Literacies

Postman (1985) points out that contemporary individuals are bombarded with visual information but have few ways to understand or act on what they see. The Deep Viewing Method provides a systematic process for analyzing, understanding, and interacting with visual information. It combines a heuristic framework (e.g. Lusted,1991), semiotic codes for understanding print and visual information (Barthes,1974; Saint-Martin, 1990), and three leveled comprehension models (Herber & Herber, 1993; Himley, 1991) to help participants reach understandings of visual information.

Deep Viewing builds on common literacy principles, content and processes. It offers a way to "read" and analyze print commercial advertisements. Its strategies may then be applied to understandings of content area textbooks.

Using advertisements as a basis to develop critical awareness of visual information and literacy skills may have several benefits. First, students and teachers are familiar with commercials. Additionally, print advertisements are readily available, connect literacy environments of home and school, contain many of the same elements and devices found in text books, and serve as an interesting, confidence-building means to develop students' and teachers' strategies for understanding print information. Furthermore, many states now mandate specific curricular goals that require the teaching and learning of critical media analysis (e.g., New York, Washington). In sum, beginning with visual analysis of print commercials and then applying these strategies to academic texts may help students and teachers to develop cohesive understandings of the meanings, structures and content not only of textbooks, but of all communicational environments in which they live.

Procedures for Deep Viewing: Code Categories

When Deep Viewing, participants begin analysis at literal, observational levels, then progress through interpretative and applied /evaluative levels using the following code categories to guide inquiry:

Sequence and Structure

This code notes the sequence of visual material on the page and the structure(s) of the print text. It answers, "In what order is information presented? How does sequence and structure of presentation influence meaning?"

Semes and Forms

Semes are units of visual meaning that create symbols. This code examines objects and people. It describes colors, textures, shapes, symbols, or repeated objects, and dress and physical traits of people. It answers, "What objects and people do we see? What are the characteristics of these people and objects? What meanings do these people and objects have for us?"

Language and Discourse

This code focuses on words and phrases that may sum up main ideas or themes, repeated language, language that seems out of place or unfamiliar, and possible meanings of language. It answers, "What language is used? What does this language mean?"

Proximity and Spacing

This code examines use of space and relations of objects in the text. It examines dimensions, relative sizes, and numbers of objects on the page, use of empty space, as well as indications of movement like gestures, arrows, or other symbols (vectorality). It answers, "How is space used? How does this use of space influence meaning?"

Culture and Context

This code situates the text in particular times and cultures. It notes symbolic or linguistic references to cultural knowledge, like images or terminology that pertain to science, art, academic disciplines, or popular culture. It answers, "What social knowledge is referred to? What is implied? What is assumed? What is missing?"

Effects and Production

This code examines devices and elements that are used in the text. It answers, "Who created this text? Why? What elements assist or prevent us from understanding it?"

Deep Viewing may be done individually, in pairs (participants progress through questions and levels), or collaboratively (participants each take a code and report to whole group at the end of each level using a Jigsaw II approach). Participants may respond through written notes, oral discussion or use of diagrams and pictures as they view.

Level One: Literal Observation

The purpose of this level is to gather as much information as possible for analysis. Describe only what you see ("a slim woman in a red dress") and avoid interpretative ("She's sexy.") or evaluative comments at this stage. ("This is sexist.")

Look at the text and answer the following questions:

Sequence and Structure:

In what order or sequence is the information presented?
What do I see first, second, third, etc.?

Semes and Forms:

Who is pictured?
What is pictured?
What are the characteristics of people and objects?

Language and Discourse:

What type of language is used? Is it formal, informal, or a mix?
Is there terminology I don't know?
Are there repeated words? Words that share similar meanings? Words that have opposite meanings?

Proximity and Spacing:

How is space used? Note the relationships on the page.
Is there more print or visual information?
Are objects/people pictured alone or in groups?
Note dimensions. Are some objects bigger than others?
Do the objects and people appear to be still? Are they moving? If so, how?

Culture and Context:

What symbols or language do I notice first?
What do I have to know to understand these symbols and language? (e.g., that caps and gowns symbolize education or doctors use stethoscopes)

Effects and Production:

What production devices and elements do the creators of the text use? (angles, fonts, artistic devices)
What clues are there that guide the way I process and understand this text?
(Uses of words like, 'first, second, third'? Bold print, highlighted passages, repeated images or colors?)

Level Two: Interpretation

The purpose of this level is to explore and construct a range of understandings about the text, the reader, and the situation. Participants now interpret the information they have gathered. They may summarize ideas, create hypotheses, connect information on the page with past and present experiences, identify and describe their strategies of analysis, and express feelings and understandings of the text. Questions to assist in these processes include:

Sequence and Structure:

What is the structure of this text?
Does it tell a story? Present an argument?
List information? Compare and contrast?
Show a problem and solution? Cause and effect?
How do you know?

What parts of the text create (or lack) sequence and structure?

Semes and Forms:

What do you think or feel when you see the objects and people pictured?
Where else have you seen these types of objects and people?
What are the most important objects or people here? How do you know?
List or discuss associations you make when you see these objects and people.
What messages does this text explicitly convey?
What messages does this text implicitly convey?

Language and Discourse:

Is there language in this text that is unfamiliar to you?
Does the language create more than one meaning for you? What are these meanings?
What sorts of feelings and ideas do you have when you read this language?
What language seems most important? Why?
What topic or topics does this text present? How do you know?
Are the language, topics, and ideas in this text used only by certain people or in certain situations?

Proximity and Spacing:

How is space used in this text?
What meanings do use of space have for you?
What meanings do big (or small) objects have?
What meanings do groupings vs. isolated objects have?
What meanings do its images of movement or stillness have?

Culture and Context:

What would you need to know in order to understand this text?
Who would know and not know this information?
Who is being addressed in this text?
How are they being addressed?
Who/what is missing or not pictured?
Who is not being addressed?
Are the forms of address and knowledge in this text part of larger cultural beliefs and practices?

Effects and Production:

Close your eyes and recall what you've seen. What do you remember? Why?
What devices are used to capture your attention and help you remember information?
Where have you seen these devices used before?
Who created in this text? How can you tell?
What are they trying to communicate to you?

Level Three: Evaluation and Application

The purpose of this level is to apply and evaluate strategies and ideas made explicit in the first two levels. Now participants should discuss how they might apply what they have discovered to other situations and texts. They may also evaluate the text and the ways they understand it.

Sequence and Structure:

Where else have you seen the sequence(s) and structure(s) you found in this text?
Is the structure of the text appropriate for the purposes and information presented?
What do you do when the structure of the text is unclear?

Semes and Forms:

Do the objects and people presented fit the textual message?
Do they appear in other texts?
Do these images convey purposes and ideas you feel are important?
Do they convey hidden or undesirable messages?

Language and Discourse:

What language is unfamiliar? Why don't you understand it?
How can you learn (or teach) what it means?
Is the language appropriate for the topic and audience?

Proximity and Spacing:

Why do you think the authors used this spacing?
What implicit and explicit messages do they convey through their use of space?

Culture and Context:

Who and what does this text include or exclude?
Is it culturally biased? If so, how? How would you address this problem?

Production Effects:
Is this text visually effective? Why or why not?
Does it fulfill it purpose?
Is it considerate of its audience?
If you were to redesign this text, what changes would you make? Why? would you use?

Questing Toward Cohesion: 22 Ways to Connect Visual and Print Literacies

After engaging in Deep Viewing analysis of print advertisements, teachers and students may engage in additional activities that foster visual and print literacies.

Below are 22 ideas to help create cohesive content reading and literacy instruction.

1) Ask students to brainstorm elements that textbooks and advertisements share. List responses on charts, a computer data base, or handouts for future reference. Guiding questions include:

- •In what ways do textbooks and advertisements structure information? (print, visual diagrams, illustrations, etc.)
- •What patterns of print text do they share? (e.g. problem/solution, cause/effect, listing, compare/contrast, definitions, persuasive vs. descriptive, expository or narrative)
- •What structures do they use to organize information? (e.g., titles, diagrams, context clues)
- •What symbols do textbooks and advertisements share? (Use of certain colors, illustrations, images)
- •What types of language do they use?
- •What cultural knowledge do they require?
- •How do they use space? (Flow charts, diagrams, larger and smaller pictures, borders and gutters, chapter or section dividers)
- •What devices do they use to explain ideas? (Bold print, charts, margin notes, graphic organizers, summaries, guiding questions)
- •How do we know what ideas in a text are most important? (Relate to Deep Viewing categories: sequence in which material is presented, semes and forms, repeated language and terms, proximity and spacing in texts, references to cultural or prior knowledge, production devices like bold print or highlighted spaces)

2) Through modelling, show how text books and advertisements share elements. Teacher and/or students identify common structural patterns, images, devices like bold print, or language.

For example, use an advertisement that has a listing structure. Ask students to identify its "signal words" like "first," "second," and "third," then to find examples in their texts as they read. Make a chart of signal words that students add to as they read.

3) After demonstrating a Deep Viewing think aloud with an advertisement, teacher repeats process on a page or chapter of a textbook to promote critical awareness of content, structures and metacognitive strategies.

4) Students perform a Deep View analysis on a text book passage. Listing and posting strategies they used to analyze the text may be helpful when they engage in content area reading.

5) Create an advertisement of a topic in a textbook or work of literature (e.g. A political advertisement for a historical figure, a commercial for a new scientific product, a public service announcement that addresses an issue raised in the classroom text).

6) Write a "textbook" summary of information presented in an advertisement. This is an excellent way to help students think critically about what information is presented and missing in a text and to promote awareness of linguistic conventions.

7) Use Deep Viewing of advertisements as a spring board to discuss differences between fact and opinion, persuasive techniques, or social issues like gender bias or racism.

8) Teachers use Deep Viewing process to evaluate textbooks or other educational materials.

9) Ask students to create a story board or story frame for an advertisement that has a narrative structure. Narrative structures are often used in "testimonial" advertisements for medicines, diet aids or financial planning. Compare and contrast narrative structure of an advertisement (setting, characters, plot, conflict, resolution) with a story framed piece of literature.

10) Students create print advertisement campaign for content area topic or literature. In groups, they first identify theme or main topic citing evidence from the text. Then, they create a logo, slogan, and print copy.

11) Students create "advertisement" study guide for content text. They must highlight important information and create an advertisement that convinces readers why and how to read it. This process is similar to a reading roadmap, which improves content learning and metacognitive skills.

12) To reinforce reading comprehension and writing skills, ask students to write a paragraph from an advertisement in which they identify the main topic or superordinate idea as well as supporting (subordinate ideas). Repeat same exercise with content area text.

13) Students examine language and images in advertisements for explicit or implicit cultural, gender, or racial biases, propaganda techniques, or persuasive strategies. Extend these observations to analysis of textbooks or secondary sources. For example, note what is missing from an advertisement. List the questions that students ask as they analyze. Use these same questions to identify point of view or biases in textbooks. Ask students to write persuasive and informational texts using strategies they find in advertisements.

14) Point of view/target audience. Students analyze advertisement to identify target audience. Stress that they must provide textual evidence for their findings. Ask them to rewrite advertisement for another audience and explain their choices of language and imagery. Tie to point of view and audience in literature lesson by asking them to note evidence for point of view and their responses.

15) Promote metacognitive skills through strategy lists and reading roadmaps. As students and teachers analyze advertisements, list comprehension strategies they used (previewing, compare/contrast, rereading, etc.). Refer and apply to these lists to content reading.

16) Effective writing and vocabulary development. Students analyze advertisements for powerful words and images. They then revise drafts of their own writing using words and strategies used during analysis.

17) Class thesauri or word banks. As students find new or effective language and imagery in commercials, they note on poster, board, in journals, or through electronic data base; they then refer to their findings when writing and reading future texts.

18) Tying texts. Students create a print or computerized data bank of common images /rhetorical strategies found in commercials and their images. Throughout the year, they add to the list as they encounter these same images in literary or content texts. (e.g., contrast of light and darkness in language or illustration; construction of arguments or narratives.)

19) Qualifying statements, "weasel" words or hyperbole. Students identify these uses of language in advertisements and list them on a classroom chart. As they read, reward them for finding the same language in their textbooks and list examples they find. Discuss if these words convey fact or opinion. Also refer to the classroom chart during writing assignments. These examples show students what not to do. Provide examples of effective writing strategies beside negative examples.

20) Study of statistics and graphs. Use these elements in advertisements to help students and evaluate understand information in math, science, or social studies texts.

21) Students collect advertisements that reflect persuasive strategies for folders or bulletin boards. They then analyze speeches, current events or their texts for these strategies.

22) Students use a graphic organizer to structure information in an advertisement and then use same strategies when reading content texts (e,g., a venn diagram to compare 2 texts, a herringbone to answer who, what, where, when, how and why; a semantic web to articulate and extend background knowledge).

Conclusion

Based on informal observations in my own high school and college classrooms, I have found that connecting literacy principles, textual structures, and reader processes through use of print advertisements and academic texts appears to have several benefits.

First, students demonstrate many positive affective outcomes, like high levels of motivation, interest, and social interaction. For example, each time I have introduced critical analysis of textbooks in preservice literacy methods courses through an initial collaborative examination of print commercials, students became so involved that they were reluctant to leave when the class session was over. Second, initial analysis of print commercials appears to foster new critical insights during subsequent readings of academic texts. Many of my high school students retained and extended the skills learned during commercial analysis. As the semester progressed, it became like a game for many to find and share "weasel words,"signal words, instances of persuasive strategies, as well as to rate effective, ineffective, or biased visual information in their textbooks. In particular, I find that after analyzing commercials, students learn to look past what is on the page and to note missing points of view or information. Many continue to allude to biases or underrepresentation they first found in commercials during successive readings of class texts. Recently, my preservice teachers noted a Whole Language bias in one of their books, citing specific textual evidence like relative use of space and sequencing of topics, diagrams, and descriptive language. Others have identified gender stereotyping and underrepresentation of ethnic groups in children's literature. One explained, "I caught it because the texts and pictures are like the ads we looked at."

Third, connecting commercials to content area texts may spark curiosity and lead to self-initiated learning. Last semester, several of my students embarked on a lengthy examination of gender biases in classrooms and instructional materials after their interest was piqued by their noticing a lack of women in advertisements for financial planning and business travel.

Next, I believe that combining advertising with content texts enables students to bridge distances among the often artificial world of the classroom and "real" experiences in life settings. For instance, after several of my high school students noted the invisibility of Native Americans in both mainstream media and their own history texts, they engaged in academic and community research to gather additional information for their peers.

Finally, making textual connections assists students to forge cohesive understandings and develop sound literacy strategies for all modern media and communicational environments. The following anecdote illustrates this point.

Last week, a student approached me before class. She excitedly told me:

> I actually used the stuff [visual analysis] we learned in here [the class]... I was watching tv and I started thinking about the categories, like how they were using space and timing and who was there and who wasn't there and what it all meant... I got really critical! ... I started seeing things I'd never noticed before and thinking about them in different ways. ... I like this class because you teach us useful things, like things you don't just use at school...things you can use now but you also apply out in the real world ...You're showing us that literacy is more than books and boring lessons... It's alot bigger and alot more connected than I used to think it was.

This student's account shows how she is making meaningful connections among literacy texts, practices, learning and environments. It is my hope that this article may offer positive directions for other students and teachers, as they quest for cohesive understandings of modern literacy.

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Old Dad And Edna St. Vincent Millay: Tools For Humanizing the Visual

by Elizabeth (Betty) Cramton and Beverlee R. Kissick

Abstract

Preparing students to be both constructors and consumers of visual information will be an important responsibility for all teachers. This will mean giving them the tools to go beyond what is merely visual to the deeper, human meanings that lie beneath. This paper suggests ways that educators, kindergarten to college, can help students define their own frames of reference, learn how their interpretation of visual symbols compares to the ways that others interpret the same symbols, and construct visual symbols for themselves.

Introduction

Nineteenth century English artist and social critic John Ruskin once wrote: "The greatest thing a human soul ever does in this world is to see something. Hundreds of people can talk for one who thinks, but thousands can think for one who can see. To see clearly is poetry, prophecy, and religion all in one"(cited in Stevenson, 1984, p. 2095).

Labeling the ability to see clearly (visual literacy) as poetry, prophecy, and religion may seem a bit extreme to the modern educator, maybe even a bit frightening, but the responsibility for helping students recognize and correctly interpret visual information is not extreme. By deliberately building into the curriculum experiences which enrich the student's exposure to the meanings behind the visual, educators may find that the task need not be frightening, either. And, thankfully there are ways for teachers to help students find meaning behind the bombardment of visual cues they confront every day-- to see beyond the merely visual, to become visually literate.

Looking Toward the Future

A century or a little more has passed since Ruskin described the value of seeing clearly, a century that took us from a time relatively free from manufactured visual cues through the invention and use of ever-increasing kinds of technology to produce and reproduce images. Students in his time would have defined "art work" as sketching, painting, or sculpting and would have learned about it in classrooms equipped with paper and chalk. Today's students have the technology to learn that there is more to the visual than "art work" and that they can create it themselves using all that Ruskin's era had plus the full power of the mediated classroom.

As teachers prepare students for a century when they will be both consumers and composers of visual objects, it is more important than ever that they recognize the paradox access to technology has created. Just as it is their job to help students learn to make full use of the power of technology, so it is their job to help them recognize that, although technology gives us chances that no generation before us had, it is still just a tool whose chief value is the opportunity it gives us to interact with other people. Contemporary Colombian philosopher William Ospina warns that the "detour of humanity into a world of objects without sense results in the confusion of all values and a lack of purpose" (cited in Wilson, 1996, p. 39).

Educators will need to find ways to convince students (kindergarten through college) that, while technology can manufacture, supply, and transmit the visual, it doesn't become literacy until it becomes human. This will mean that students will need to look beyond the surface of what they see to discover the meanings behind the visuals. S.I. Hayakawa (1964), referring to what made words human, pointed out that there are really two meanings for most words-- their extensional (concrete) meanings and their intensional (implied) meanings. The same could be said of visual representations, and helping students learn about the power such representations have over the way they feel and think and respond to their world will predictably become an ever-greater part of classroom responsibility.

A recent monograph by E. Cornish (1996) of *The Futurist* magazine, for example, predicts that by 2025 people's attention may become this world's most precious resource. The competition for such a valuable commodity is likely to be fierce, although not necessarily fair. Ruskin could have walked down his London street and encountered a few hand-crafted or crudely printed signs begging for his attention. What does today's visual consumer find? What will confront the citizen of 2025?

Recognizing Frames of Reference

One important way that educators can prepare students to be wise visual consumers is to help them define their own frames of reference. A simple activity, and one that really could have meaning for any age student, is to do what we call "Old Dad" (honoring Dr. Kissick's father who used to entertain his daughters with it). The participants first look straight ahead and describe what they see directly in front of them. Then they are invited to change position, to bend, to stretch, to move. With each shift of position comes a new view of their world. Even the youngest student soon learns that there is a tangible link between the angle they look at something and what they are able to see.

Of course, becoming visually literate goes beyond changing just our physical perspective. The real lesson of "Old Dad" is that flexibility increases visibility, and that takes on a symbolic significance, too. Consider what happens when we ask students to move beyond themselves, to view the world from someone else's perspective. Late twentieth-century students find themselves in a time when technology has challenged them to confront a great deal of cultural diversity. How do educators prepare them to deal with situations when they confront a person whose age, physical ability, ethnicity, skills, national origin, or economic status is different from their own? The flexibility:visibility connection will be important here, too, won't it? One way to do this would be to ask students to examine stereotypes and to contrast those stereotypes with reality. Students could be asked to locate, imagine, or construct something that reminds them of a person whose background or ability is different from their own -- in other words, to define that person using a single symbol. A person from The Netherlands might be symbolized by a wooden shoe, one from the North Pole by an igloo. How would education or personal contact with a real person from either of those places refine the students' attitude? How much trust would they place in the accuracy of their original symbol? Would one symbol be enough? How does the flexibility of their experience improve their visibility?

Comparing Symbolic Interpretations

Students who understand that no one symbol can be counted on to represent an entire group of people will be ready, perhaps, to examine how the meanings of common symbols change based upon individual perspective. Jonathan Swift said that "vision is the art of seeing things invisible" (cited in Stevenson, 1984, p. 2095). Symbols encourage us to do this. Each of us can look at a common symbol (a red heart shape, a cornucopia, a swastika) and feel an immediate, often emotional reaction. The trick comes in recognizing that each reaction is formed out of our own experiences and that each, therefore, is individual. Educators can help students learn that they will all probably feel something as they look for the invisible meaning behind the visible symbol, but that each one of them will feel something slightly or significantly different from what others around him/her are feeling. Depending on the experience or sophistication of the students, teachers can construct activities to help them discover if all of them are "seeing" the same thing. Kindergartners, for instance, often visit pumpkin patches in the fall. Couldn't teachers help them to learn about diversity by asking each to tell what the pumpkin meant to her/him? Many U.S. children will immediately think of Jack O'Lanterns or Thanksgiving pies. Children from other countries, whose experiences would be different, probably would not.

Older students could use a similar exercise to discover what their country's flag symbolized to them, personally. This would be an excellent opportunity to use visual literacy skills in a wide range of courses. Sociology students could contrast the change in attitudes among persons in different age groups. History students could discuss how the design of the flag had evolved over time or how respect for it had shifted during various times in the country's history. Communications students could define its personal or universal symbolism in essays or speeches. Art students could be asked to redesign it to represent the perspective of a particular individual or ethnic group. Psychology students could examine man's fascination with and reliance on symbols. Journalism students could experiment with the relative impact of different layouts using the symbol. Business or economics students could discuss its value as a marketing tool. However teachers choose to use this activity, though, it will be important that they build in ways for the participants to share their results with each other, since this will reinforce the connection between perspective and attitude.

Constructing Personal Symbols

Another way for students to discover how powerful visual symbols are is to begin to construct some for themselves. An activity which is fully adaptable to age or subject is one we call "The Cup." For this one students are given a pencil, a sheet of paper, and a plain Styrofoam cup. They are instructed to trace a circle onto the paper using the large (open) end of the cup as a template. Inside that circle they are to draw something that symbolizes themselves. A person who believes s/he is basically cheerful, then, might turn the circle into a smiley face. A banker might do some variation of a dollar sign. An athlete might draw a baseball. It will be important (especially with adults) to emphasize that the quality of the drawing is not as important as the depth of thought that goes into creating it. Indeed, some of the drawings will be crude, some elaborate, but all ought to be well thought-out. Once again, the power of the activity comes as participants begin to share their drawings and to explain why they chose to depict themselves as they did--as they begin to reveal the invisible selves behind the visible ones.

Considering Another Angle

However students deal with symbols, whether as consumers or constructors, the real task for educators will be to help them see that they can gain perspective by changing their angle. This angle may simply be a physical one as in the Old Dad activity, but more often it will mean that they will need to rearrange themselves emotionally, socially, or psychologically in order to experience this shift in perspective. This latter challenge is sometimes frightening, especially if students feel that they will have to give up their own identity or assimilate a new one. A final challenge for educators, then, will be one of helping students learn to recognize what they have to gain by learning to discover meanings behind visuals from more perspectives than their own. They do not have to give up their own traditions or beliefs to do this. Instead they can live richer lives by learning about how others interpret the world's symbols. By learning to use their minds and their hearts as well as their eyes they can equip themselves to be better visual consumers, better citizens of the world, better friends.

Conclusion

Early in this century Edna St. Vincent Millay wrote a poem which began "All I could see from where I stood...." Literary critics generally agree that the poem depicts spiritual or religious growth. Indeed, its title, "Renasence," means rebirth. As we stand on the threshold of a new century, one which is likely to ask its citizens to be better visual consumers than they have ever been before, perhaps we can turn to this poem for guidance once again. Is there in the poem a pattern for personal growth? Does it offer a hint about how to expand our viewpoints and thus expand our world and our understanding of it? "The world," Millay reminds us, "stands out on either side/No wider than the heart is wide" (cited in Warfel, Gabriel, & Williams, 1937, p. 1362). Becoming visually literate implies more than just recognizing the existence of shape or color or form. It means more than just assigning or constructing symbols. For tomorrow's citizens to be good consumers of visual elements, for them to be able to deal with the bombardment of symbols that will compete for their attention, they must somewhere learn to view the world with their hearts, too. Helping students look for and recognize the humanity behind the visual gives them another perspective, another angle. It enriches their educational experience. It helps them deal with change and diversity. And, it prepares them to enter a hectic world better prepared to make sense of it all.

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A Review Of *Slim Hopes:*
Advertising & The Obsession With Thinness
by Richard Couch

Abstract

The following is a review of *Slim Hopes: Advertising & The Obsession With Thinness*, a video by Jean Kilbourne produced by the Media Education Foundation. The video is divided into seven main parts and discusses America's compulsive behavior in our desire to be thin. This video is a wonderful tool for professionals in the communications and health fields.

Slim Hopes: Advertising & The Obsession With Thinness is a 30 minute video produced by the Media Education Foundation which is affiliated in some way with the University of Massachusetts. The video discusses America's compulsion with thinness.

The author and main "talking head" in the video is noted researcher Jean Kilbourne of the University of Massachusetts. She has also created another award winning video titled *Still Killing Us Softly*. Although the format of the video is the traditional "talking head," (obviously a video of a lecture Dr. Kilbourne presented to a group) she uses over 120 ads from print and television to emphasize the demoralizing, degrading and life-threatening way that we Americans look at food in our culture. A close look at these images often displayed in film, TV and magazines discloses our view of food as decadent or sexy, often leading young women to such eating disorders as anorexia and bulimia.

The video is divided into 7 sections including 1) Impossible Beauty, 2) The Waif Look, 3) Constructed Bodies, 4) Food and Sex, 5) Food and Control, 6) The Weight Loss Industry and 7) Freeing Imaginations. The content and examples from advertising are provocative and engaging. In Section 1, Dr. Kilbourne discusses the notion of female beauty and America's fascination (some would say compulsion not to mention time, energy, and money spent) with some "ideal" female beauty. Section 2 includes an explanation of the "waif look" that is represented by super models. This "super model" (just look at the words we use to explain these women) body type of tall, thin, broad shoulders and small hips excludes 95% of all women in the world. Dr. Kilbourne suggests that women are supposed to be pear shaped. This vision of women which modern advertising agencies promote may cause serious eating disorders and terrible self-concepts in young women. For example, 11.3% of college women have bulimia nervosa; 80% of 10-year-old 4th grade girls are already on a diet. The health implications are frightening. Eight million Americans, mostly women, suffer from anorexia or bulimia.

In Section 3, Kilbourne discusses sculpted bodies, what she calls the "voluptuous look." We Americans are obsessed with fitness and in many cases at the expense of our health, for example, the recent disclosure of leakage from silicon breast implants. This debilitating disorder is directly related to the desire of some women to be more voluptuous.

The food industry is the center of discussion in Section 4. Companies spend 36 billion per year in advertising. The cereal industry spends 20 times more on advertising their products than they do on making it. Food has become a way to escape and/or a way to alter one's mood. In some cases, food is even being marketed as a substitute for sex. As a further example, Section 5 demonstrates how advertisers combine food and the ability to control oneself. For example, "good girls" are those who don't eat. Some advertisements make women feel ashamed for eating; women who eat are too indulgent; they can eat diet or fat-free dessert and become less self-indulgent. Many women pick at their food when they eat in front of others, but binge later. The extreme of this control, according to Kilbourne, is the feeling that good girls keep all of their appetites under control. The assumption is that we all know girls who can't say no.

Section 6 is perhaps the longest section and discusses in-depth the weight loss industry. Advertisements are geared toward religious, moralistic language, even using such words as temptation, sin, and salvation. This industry knows that Americans have a terrible prejudice against fat people, especially women. Thirty years ago, the $33 billion diet business did not exist. Fifty percent of all women are on a diet at any one time in America. Seventy-five percent of statistically "normal" women think they are fat. The physical/medical damage is compounded by the fact that 98% of dieters who lose weight through commercial programs gain it back and more.

One other related factor addressed in the video is the connection between smoking and thinness. Ninety percent of all smokers start before they are age 16 and many women who smoke say they can't give it up because they will gain too much weight. What a strange paradox: Women are willing to continue smoking which they know damages their health rather than gain weight which is health threatening but which society says is uglier than smoking. This insidious public health problem is the focus of the last section of the video.

Kilbourne suggests that we as consumers and as willing participants in the skullduggery of the advertising industry must take an active role in challenging the images that we see on our TV screens, in our movies, and in our magazine advertising. In closing, Dr. Kilbourne points out that the #1 wish for most adult women is to lose weight. If we cannot address the root of the problem -- popular media advertising -- we are destined to continue to believe in the thinness mystique.

Although the talking head nature of this video bothered me, the message is powerful and important. The research and the conclusions reported seem solid although there were times when I wanted to challenge assumptions garnered from the research. The video is an important resource for anyone teaching media courses or health courses. It can be purchased from Media Education Foundation, 26 Center St., Northampton, MA 01060, (413)-586-4170. http://www.igc.apc.org/mef/mef.html. I also found the business to be very cooperative in sending preview copies.

Hypermedia: New Dimensions of Literacy

by Mary L. McNabb

Abstract

Changes in literacy codes and conventions due to hypermedia technology are discussed. Starting with a brief history of the synergistic relationship between technology and literacy, the article examines the need for redefining literacy beyond print-based communications. Key literacy codes inherent in electronic hypermedia text are compared with those fostered by printed-based text. These codes have emerged from hypertext's associative narratives, film grammars, and pictorials. The article calls for continual examination of emerging hypermedia communications in order to establish the conventions of electronic literacy.

Technology's Influence on Literacy

History tells the story of a synergistic relationship between technology and literacy. For the past five centuries, the technology of the printing press has defined the organization and presentation of communication (Bolter, 1992, p. 20). The printing press spawned a genre of written communication found in books which is predominantly characterized by linear narratives that provide transitional passages from one related idea to another. These transitions typically explain the author's rationale behind connecting ideas. Print-based writers are taught to provide readers with a coherent line of reasoning embodied in grammatical sentence structures and paragraphs connected by explicit transitional expressions. Print-based readers are taught to look for the author's thesis or main idea and to comprehend supporting points connected to the thesis in a coherently flowing narrative.

The narrative evolved and flourished for hundreds of years within cultures where print-based linear communication dominated. The written word came to dominate communication in educational realms as well as in communities because "the text was the first cheap, mass produced form of knowledge representation we had: it is called printing, and it made a revolution" (McCorduck, 1992, p. 246). Those of us who learned to be literate in a culture where printed text dominated communication have "learned to process reality in terms of a logically ordered, continuous and linear world" (Gumpert & Cathcart, 1985, p. 24). *The Literacy Dictionary* (1995) currently defines literacy as "active, autonomous engagement with print and stresses the role of the individual in generating as well as receiving and assigning independent interpretations to messages" (Venezky, 1995, p. 142). In this paper, I suggest that literacy, in a computer-networked society, is not solely about reading the printed word. Rather it encompasses receiving and sending messages in a hypermedia format.

Barnhart (1991), in a synopsis of the history of human communication systems, describes how documented or written forms of human communication started with pictures and evolved, passing through the phonography-word syllabic and phonography-syllabic to the present print-based phonography-alphabetic communication system (p. 3). In the modern print-based system of communication, the writing and the reading of phonography-alphabetic forms of communication proliferated. Barnhart (1991) suggests that the alphabetic systems of modern printed-based cultures serve the aim of human communication *better* than the preceding ones, by reducing the use of visual symbols and long-term memory space (p. 12). "However, in consequence, each new script represented language in terms that were more remote from meaning than the units of the preceding script, thus posing new problems for learning and deciphering" (Barnhart, 1991, p. 12).

Educators involved in the technological developments of the 20th Century have grappled with the problems for learning and deciphering posed by the print-based culture, and have posed solutions related to multi-sensory, multi-dimensional modes of communication. Multi-sensory instructional theory and practice, as we know it, originated with Comenius' *Orbis Sensualium Pictus* (Weber, 1930, p. 27). Comenius popularized illustrated textbooks or visual aids that served to associate "objective reality, or its pictorial representation, with abstract cognate word symbols" (Saettler, 1990, p. 31). Comenius also developed a theory of instruction that deals with every phase of instruction which Pestalozzi later implemented as principles of instruction based on "the laws of natural human development" (Saettler, 1990, p. 36).

Weber, another pioneer in the realm of multi-sensory communication, divided visual experience into two classes, real and vicarious. "Real experience arises from a conscious response to an actual problematic situation . . . vicarious experience, by way or difference, arises from a response to an unreal, or make-believe situation, which is represented to us by change, gesture, word, line, form, or arrangement" (Weber, 1930, p. 1). Weber (1930) asserts that viewing a motion picture provides vicarious experience at its fullest. Through this century, the need for vicarious experience in human communication has grown along with an increasingly complex merging of diverse cultures brought together by telecommunication technologies.

Although print-based human communication is the dominant mode of communication in western civilization, it deprives learners of the essential basal experiences that allow for an accurate translation of word symbols, resulting in a potential mismatch between mental images and word associations (Berger, 1987; Gumpert & Cathcart, 1985; Kellner, 1988; Weber, 1930). McClusky (1949) discussed this phenomena nearly a half-century ago, stating: "Studies of language development show that elementary word and number meanings arise out of sensory experience with objects and things, but later words and numbers are used in a manner which removes them from the concrete. Hence, words and numbers may become highly abstract and complex in use and in meaning. In fact, they may be "abstracted" to the point of being meaningless. Therein lies the disease, known as verbalism, which plagues instruction" (p. 1). Researchers and educators throughout the 20th Century have grappled with the problems posed by alphabetic systems dominating human communications since the development of the printing press. Given Barnhart's (1991) premise that human communication systems undergo an evolutionary process, I suggest here that microcomputer technology is facilitating yet another evolutionary step in human communication which defines and embodies a new form of literacy.

Many agree that literacy is above all culturally bound by the social contexts and customs surrounding the communication act. Putting it best, Boyer (1987) states that "true language literacy is achieved only through *cultural literacy*" (p. 81). The term cultural literacy, initially an American phenomenon, refers to one's ability to understand an area of knowledge (Barton, 1994, p. 13). "The equivalence between text and knowledge is one of the great unacknowledged assumptions of education in the past few centuries" (McCorduck, 1992, p. 245). In today's computer-networked society, cultural literacy reaches beyond the tradition of print literacy to include visual, media, and computer literacy as well (Considine, 1987; Feinstein, 1993; Griest, 1992; Kellner, 1988).

Fundamentals of Electronic Literacy

Hypermedia technology, with its rapid innovations capable of processing multiple modes of communication, challenges commonly held assumptions about the nature of literacy. It is increasingly apparent that interactive hypermedia is the up and coming mode of communication for the 21st Century (Considine, 1987; Galbreath, 1994; Kalmback, 1994; Kellner, 1988; Popkewitz & Shutkin, 1993; Shirk, 1991). In early predictions, the hypermedia industry was expected to grow rapidly from $3 billion in 1991 (U.S. and Canadian markets) to estimates from $13+ to $31+ billion by 1995 and estimates ranging from $34+ to $81+ billion by the year 2000 (Brandt, 1992). Although print-based texts continue to dominate communication in education, static print-based linear text no longer dominates American cultural communication: "Sixty-five percent of information imparted between people is nonverbal in our culture" (Considine, 1987, p. 634). Some claim that the emergence of multi-sensory, multi-linear communication is so profound that it indicates a new, postmodern era in history (Griest, 1992; Kellner, 1988; Landow, 1992; Faigley, 1992). Electronic forms of communication spurred on by advances in hypermedia and computer network technology embody important cultural changes influencing the nature of literacy itself.

Electronic communication not only includes printed text but may also encompasses pictorials, film grammars, and multi-sensory structures requiring semiological analysis. Some use the term "media literacy" to refer to the new forms of electronic communication. The objective of media literacy instruction involves students in "learning the skills of deconstruction, of how cultural texts [media] work, how they signify and produce meaning, and how they influence and shape their 'readers'" (Kellner, 1988, p. 47). Gambell (1989) identifies the mental operations characteristic of literacy as the ability to crack a code, to derive information from the code, to derive meaning from the information, to act on such meaning, and to make inferential and other cognitive structures from the meaning to arrive at new meanings (p. 273). Given these characteristics, the definition of literacy is no longer bound by print, but may include the full range of multi-sensory information found in hypermedia communication systems.

Characteristics of Hypermedia

Essential to understanding any hypermedia communication system is an understanding of hypertext. Hypertext "consists of a network, or web, or multiply connected text segments. Hypertext writers set up multiple connections between nodes of a text, and readers choose which links to follow, which nodes to read, and which nodes to skip" (Johnson-Eilola, 1994, p. 197). Conceptually, hypertext can be used for several communication purposes. One purpose is to facilitate locating information. The search engine capability of the computer allows one to type in a key word or words and to search a single text for all references to the word in context. The user of computer networks such as the World Wide Web may employ a "key word" search strategy to locate information in individual texts stored within the network's databases. Another use of key words are preprogrammed hyperlinks created by a hypertext author. Preprogrammed hyperlinks are created with hypertext mark-up language (html). The hypertext author utilizes html to establish connections between electronic files which may contain printed text, or audio, video, and pictorial stills and animations.

There are fundamental differences, however, between types of hyperlinks. Links that are created through key word searches reflect print-based activities engaged in by readers of cross-references such as encyclopedias, dictionaries, technical manuals, citations, and footnotes (Johnson-Eilola, 1994, p. 201). Links created by authors and embedded within documents represent an innovation in communication much different than the linear, transition-laden narratives of print. The hypertext author may create a variety of hyperlinks representing a multitude of rhetorical strategies involving key words, their synonyms, antonyms, analogies, comparisons, contrasts, associations, etc. The hypertext author may draw on known rhetorical strategies employed by print-based linear writers, or may invent new strategies for linking nodes of multi-sensory information.

Hypertext, indeed, represents a new medium for thought and expression (Bolter, 1992; Eldred & Fortune, 1992; Nelson, 1992; Shirk, 1991). The process of reading in hypertext conversely becomes an interactive process of constructing meaning in that the reader has choices to make about which hyperlinks to pursue. In addition, the hypertext reader not only can rely on a linear narrative flow laden with transitionary statements which explain the connections between sentences and paragraphs. In hypertext, the hyperlink is the transition and comes color-coded without an explicit explanation as to where it may lead. While the process of meaning making is nothing new to literate readers, the multiplicity of choices facing a hypertext reader calls for new skills related to drawing inferences, and some yet unknown reading strategies. Paths in hypertext are characterized by multi-linear, subordinated, cyclic, and associative thinking patterns that form the basis for new grammars and structures of communication in electronic environments (Bolter, 1992; Ulmer, 1992).

With the rapid advances in computer technologies capable of processing not only large amounts of print-based texts, but audio, visual, and film texts as well, hypertexts are often embedded within hypermedia communication systems. Hypermedia is characterized by nonlinear hyperlinks within a multimedia environment (Lockard, Abrams & Many, 1994, p. 219). In other words, hypermedia's fundamental operating principles derive from hypertext. Hyperlinks, in a hypermedia communication environment, relate printed text to audio text, or visual displays, or film clips. While hypertext draws on the standard grammar of its verbal language origin, hypermedia draws on lesser known grammars from 20th Century fields of communication including cinematology, visual literacy, and semiotics. Here again, in new combinations, the grammar of hypermedia is little known. We need to take a close, analytical look at emerging grammars from new types of electronic communication systems in order to begin to understand the evolutionary literacy of the coming age.

An underlying premise of visual instruction is that all visuals are arbitrary to some degree, requiring acquired skill to compose and comprehend. Current objectives for visual literacy instruction regard teaching the learner how to comprehend both literal and metaphoric meanings of visuals through descriptive reflection, composition analysis, context analysis, and evaluation of images (Considine, 1987; Feinstein, 1993). New literacy codes are also manifest in media grammars or structures. Film grammars include the close-up shot, medium shot, long shot, full camera shot, and tracking shots (Berger, 1987; Considine, 1987; Fehlman, 1992). Camera distance indicates or signifies meaning. For example, close-up shots signify intimacy; in contrast, full shots signify social relationship (Berger, 1987, p. 152).

Audio codes, though hardly mentioned in the literature about literacy, include oral narration, dialogue, music, environmental sounds, and quiet pauses (Fehlman, 1992). The comprehension of multi-sensory codes constitutes the substance of media literacy efforts aimed at enhancing one's ability "to intuit or predict the next sequence [which] makes communication possible" (Gumpert & Cathcart, 1985, p. 28). Such intuition or prediction relies on familiarity with the cultural codes the composer employs to connote meaning within the media. Of concern to educators should be the gap that exists between the institutionalized codes of traditional, print-based curriculum and codes encountered daily by students living in a computer-networked society: "Just as people learn to speak and to think in the grammar of the media first acquired, they take for granted a world view which rests upon a reality structured through available communication technology" (Gumpert & Cathcart, 1985, p. 30).

Hypermedia carries complex messages embedded in a multi-sensory, interactive medium, making plausible the notion of a new literacy. The trend toward hypermedia as a mode of communication in mainstream American culture indicates a need for educators, who shoulder much responsible for the literacy of youth, to look beyond print-based notions of literacy to an emerging cultural literacy driven by and embodied in electronic hypermedia communication systems.

Emerging hypermedia technology particularly challenges the assumption that the printed word is the best communication medium for educational purposes. Changes in cultural communication need to be reflected in the classroom. "One of the greatest areas of deficiency is the failure of the school system to provide young people with an understanding of the form and content of the communication technology of their society" (Considine, 1987, p. 639). Hypermedia may soon constitute the student's *first language*. With this in mind, I have attempted to outline a historical rationale for redefining what it means to be literate in the age of electronic communications.

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Perception Of Elementary Students Of Visuals On The Web

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Abstract

The way information is visually designed and synthesized greatly affects how people understand and use that information. Educators have long been aware that conceptual and perceptual styles, past experiences, and cultural background affect the way people learn. Good teachers consider individual differences and learning styles as they teach. Now, increased use of the World Wide Web as a teaching tool makes it imperative to question how visual/verbal information presented via the WWW can increase or restrict understanding. The purpose of this study is to examine students' perceptions of the effectiveness of visuals in conveying the instructional message.

Introduction

Today's rapid advancement of new technologies has made the impact that visual images have on education very evident. Heinich, Molenda and Russell (1993) stated, "We are a visual society; one that has experienced the increasing production and distribution of visual messages in recent years" (p. 66).

One of the more prominent emerging technologies is the World Wide Web (WWW). An ever growing number of educational sites are being developed on the World Wide Web to provide a source of information for teachers and students. The graphical user-friendly features of the World Wide Web allow for greater versatility of presentation design. The Web designers are able to accommodate a wider range of learning preferences by using Web attributes such as sound, images, and text. The educational sites are generally useful in content. However, the quality of the design, from an instructional design perspective, is not always what it should be (El-Tigi & Branch, in press).

The purpose of this study is to examine students' perception of the effectiveness of visuals in conveying the instructional message. The contention is that good instructional design provides procedures for assessing the quality of the graphics in terms of how they are perceived by the intended audience.

The focus of this study is to examine specific visual design elements specified by researchers (Heinich, Molenda and Russell, 1993) as attributes of quality visuals. The research question is: How does the intended audience perceive the effectiveness and meaningfulness of the visuals presented in terms of the following:

- information/instructional purposes graphic/picture elements
- text/lettering elements
- color
- layout

Designing with Learning Preferences in Mind

The process of designing effective instructional media relies upon careful planning. The planning should include a needs analysis and a learners analysis. The learners analysis must contain the learner's learning preference (Dick and Carey 1996). A learner's learning preferences may be one of the following:

- visual: a learner prefers to read rather than listen to discussions;

- auditory: a learner prefers to listen to a tape and/or discussions rather than read: and
- kinesthetic: a learner prefers concrete experiences rather than abstract learning.

Therefore, a designer must create with all three of the learning preferences in mind. In a Web Course design, the designer should include written language with audio script of the text for the auditory learner. The course should include graphic pictures that represent the meaning of the text for the visual learner.

Learning from Visuals

According to Heinich, Molenda and Russell (1993), students learn from visuals by being able to read, understand, and interpret visuals accurately. Thus, the students decode the information that they see. The students must also be able to encode information by creating a visual in order to communicate effectively with others through the visuals.

When visuals are used in a Web site, the images are used to illustrate something. The images should illustrate as accurately as possible the designer's point of instruction. They should be realistic pictures that allow the learner to create an association between the text and the image. The image should help cue the student learning process. For example: if the designer's site is informing children about poison, the designer might include a graphic of skull with two bones crossing making an "X". This symbol is the common symbol for poison.

Designing Visual Material for Learning

Meaningful learning is one of the fundamental tenants of instructional design. According to Ausubel (1968), material presented is comprehended in the process of internalization. Visuals serve as concrete clues to meaning. Concrete referents enhance communication and understanding through clarification of abstract concepts. Heinich, Molenda, & Russell (1993) state that visuals "Attract attention, sustain attention, and generate emotion" (p. 66). Consequently, visuals aid reiteration of information by allowing easier storage and retrieval of information. Ultimately, visuals can also motivate learners by increasing their interest in the text.

There are several factors to consider when designing visuals for instructional purposes. Among these factors are color selection, layout of visual and verbal elements, text and lettering and texture among others.

Text/Lettering Elements

Three factors ought to be considered in the design process: style, color of text and size of text. Heinich, Molenda, and Russell (1993) recommend that consistency and harmony with other elements influence the choice of style. Plain style is suggested for use for instructional material. Lowercase letters are most legible. Short headlines maybe written in all caps as long as they do not exceed three words. The color of text ought to be selected based on how well it contrasts with the background color. Contrast enhances legibility, while stronger contrast achieves greater emphasis. Finally the size of lettering ought to be estimated based on the distance from which it will be read. Therefore, larger text size should be used for bigger classrooms.

Color

Research attributes mood and movement to color. Color commands attention and enhances visual impact. Color serves to heighten realism of image; point out similarities and differences; highlight important information and detail; and create a particular emotional response (Heinich, Molenda, and Russell, 1993). Colors could be categorized into cool and warm colors. Warm colors such as red, yellow and orange could be used to approach the viewer to gain the readers attention. In contrast, cool colors such as blue, green, and violet tend to retract.

Layout

The arrangement of the text and graphics help the design into a logical sequence for learning. Faioloa and Debloois (1988) found that dividing larger portions of information into smaller units of information improves visual clarity and results in improved retention of information. Therefore, the arrangement of the information should be consistent throughout the design of the course because the learner needs to concentrate on the content of the information and not the way it is presented.

Texture

Texture is a characteristic of three dimensional objects and materials. It serves to convey a clearer idea of the subject to the viewer by suggesting the sense of touch. Texture provides emphasis, separation, or enhances unity. Given the multi-dimensional attributes of the Web, scanned images, cartoon characters and texture enhanced images are easily depicted.

Method

The designer should be creating Web courses with the learner in mind. In order to see the extent to which the learners could contribute to the evaluation of an instructional material on the Web, we interviewed elementary students on their perception of visual design in a Web course.

Participants

Participants of the study are 7, 8 and 9 year olds. Fifteen students were able to participate in the study. Students were asked their overall understanding of the topic, their learning preference and their perception of the visual aids in the course.

Table 1 Participants

Male	6
Female	9
7 year olds	1
8 year olds	1
9 year olds	13
3rd Grade	2
4th Grade	13

Data Collection Procedures

We used one of the top 5% (rated by Point Communication Corporation) Web course sites for children. We selected this site due to the appropriateness of the content, which is specifically geared to that population group.

A ten-item survey was designed to elicit specific responses regarding comprehension of instructional message based on both image cues and text. Pages geared at three specific situations were selected out of approximately 20 sets. The selection process was based on a pilot study which helped determine the most useful content to the specific age group and also the overall quality of the information and visuals provided. The best three were selected based on this criteria. We asked the children about the design of the pages including:

- information/instructional purposes
- graphic/picture elements
- text/lettering elements
- color
- layout
- texturing

Students were interviewed in 10 minute segments given their short attention span and also the constraints of conducting an interview during specific class hours.

Data Analysis

Information/instructional purposes

Throughout the interviewing process, none of the students understood that all the sites dealt with kid safety. This phenomenon was expected by the researchers because the Web course only mentioned the performance objectives on the beginning home page. This is interesting because a key principal of Instructional Design is a clear statement of the performance objective for every introduction of a new instructional event. Listed below are the students perception of the Web sites.

What do you think the Web site is about?

Site 1: Telephone Safety

- telephone
- teacher about to teach - sitting at a desk
- when you are alone
- waiting for a call - thinking about answering the phone
- telephone
- principal - what if the telephone
- what to do if the phone rings
- Do I answer the question- What should I do if the phone rings
- waiting for something
- answer phone
- talking about a phone
- teacher sitting at desk
- don't know what site is about

Site 2: Drug Safety

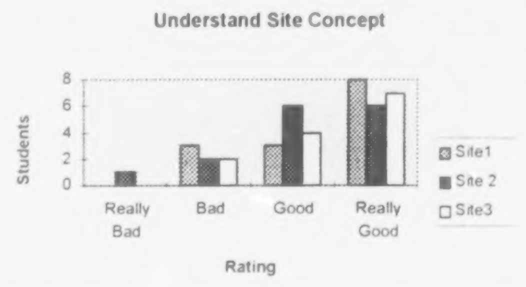
- drugs
- person drinking
- selling drinks
- sell someone drugs
- kids offering wine
- drugs and alcohol
- not sure - not to take drugs or alcohol
- drugs or alcohol
- not clear
- asks a question- what should you do
- bullies
- drinking
- drugs - alcohol because there is a beer bottle

Site 3: Poison Safety

- stay from poison
- rabbit happy
- rabbit hopping no idea what
- someone drinking cleaning stuff
- rabbit looks sick
- rabbit with yucky face - poison
- somebody swallowed some poison
- not to drink poison by reading
- rabbit scared
- poison
- no idea- I don't know
- poison site
- it says poison

As the students read the information being presented, it became apparent to the researchers that the majority of the students understood the concept of the sites (Figure 1). At this time in the research process, the students did not use the visual designs to interpret the meaning of the sites. The students comments were:

Figure 1



Tell me one thing you have to do to be safe?

Student Comments

Site 1: Telephone Safety

- never tell caller your alone - no way get a life

Site 2: Drug Safety

- say no to drugs

- say no
- tells you to choose a different friend, nobody around
- walk away report to adult
- walk away and tell parents - several don't make sense

Site 3: Poison Safety

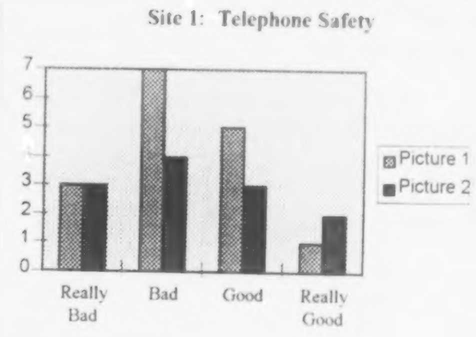
- writing tell you all the things you should do
- walk away and report to adult
- call 911

Graphic/Picture Elements

The visual designs did not help the students make an association with the information being given (Figures 2 - 4); even though, the students tried to make an association between the picture and the information being given. The following are some of the students interpretation of the visual designs.

Do the pictures help you understand what to do?

Figure 2



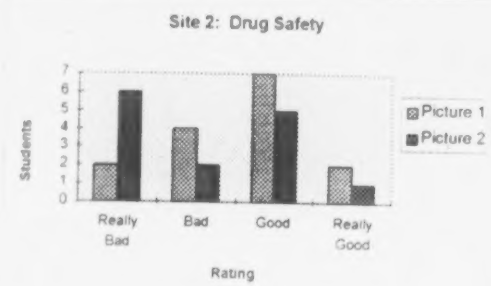
Site 1: Telephone safety Picture 1

- little/has a phone- someone is going to answer
- no clue of answer - there is a telephone
- how to deal with electricity

Picture 2

- wiggling
- nobody says no
- never say your name
- talk to parents

Figure 3



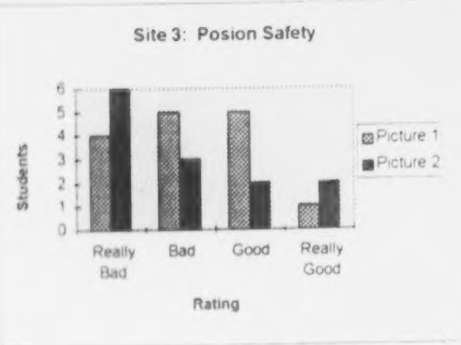
Site 2: Drug Safety Picture 1

- person drinking little hit because
- someone offering
- someone is offering
- does kid handing out wine to other kids
- picture not good
- doesn't tell if it is a bad drink
- because of XXXX on bottle
- doesn't tell about drugs

Picture 2

- dressed to go out - waiting for someone to come
- not clear
- she is not drinking any

Figure 4



Site 3: Poison Safety Picture 1

- not clear
- tell parents - say no to do whats right
- he could be screaming about seeing a ghost
- because he's drinking poison
- somebody joking around - something is wrong
- he looked sick/different color eyes - funny thing or bad
- shocked may be sick
- don't swallow things

Picture 2

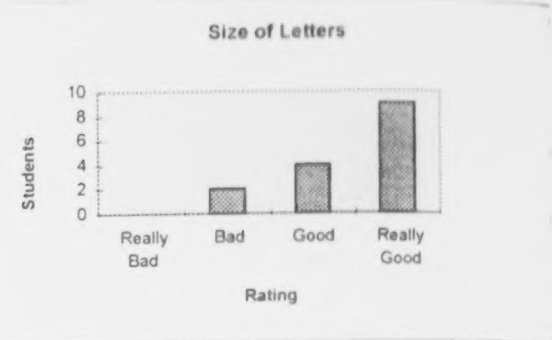
- rabbit eat something good
- rubbing tummy cuz happy and something good
- not doing anything
- rubbing stomach
- he's happy and smiling

Text/Lettering Elements

The majority of the students thought the size of the lettering was okay (Figure 5). This is opposite of the opinion of the researchers.

Are the letters large enough to read?

Figure 5

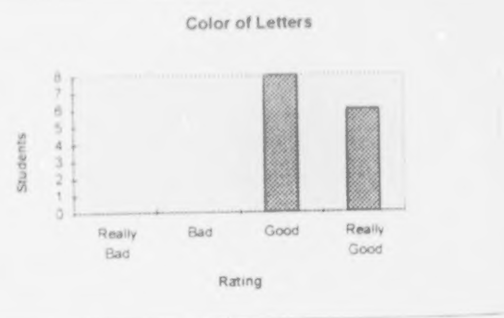


Color

The students like the color of the lettering and the background (Figure 7 and 9). Some students did have suggestion of different colors for both the letters and the background (Figure 8 and 10). The students response is the opposite of research conducted in the field of color. According to research, children prefer warm colors: however, this Web course used cold colors.

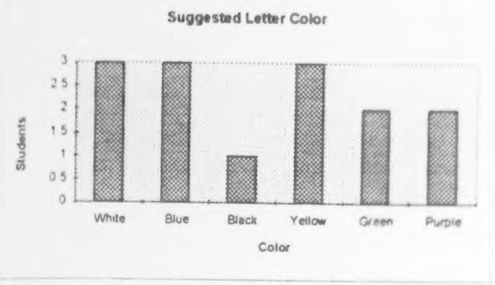
Do you like the white colors?

Figure 6



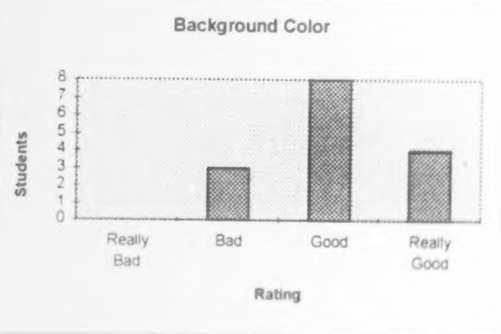
What color would you like to make the letters?

Figure 7



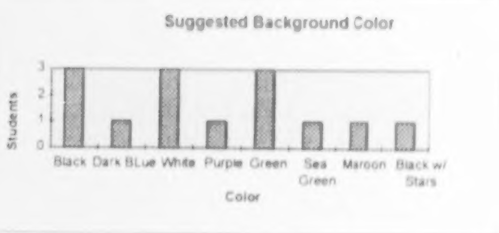
Do you like the black background?

Figure 8



What color would you make the background?

Figure 9

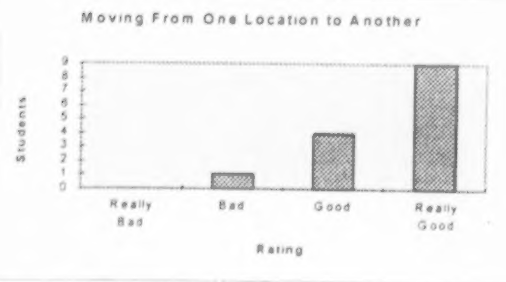


Layout

The students liked the layout of the sites. All of the sites were uniformed and contained the same number of visual designs to help the students. None of the students had difficulty moving from one location to another location in the Web course (Figure 10).

Is it easy to move from one location on the page to another using the icon?

Figure 10



Other comments students mentioned

- have a computer but don't use it
- writing helped - picture no good
- not familiar with screen - like to learn this way
- worked on hi-tech at old school - would like to learn about computers
- exciting to wait - something might pop up
- used computers - not very familiar with on-line - likes this learning
- not familiar with on-line document - pictures not enough detail - no the information not helpful - nice to have picture (don't tell) use mouse

Discussion and Conclusion

The way information is visually designed and synthesized greatly affects how people understand and use that information. Educators have long been aware that conceptual and perceptual styles, past experiences, and cultural background affect the way people learn. Good teachers consider individual differences and learning styles as they teach.

Therefore, the design of quality instructional material involves a learner-centered approach which takes into account the learning characteristics of the intended audience of the Web site. Each component of the information presentation process for a Web course must be designed with the intended learners age, learning preferences, and culture in mind, in addition to several other characteristics. The quality of information presentation for instructional purposes should be assessed in ways which involves the process of designing, developing and evaluating instructional material. Therefore, the Web Designer must incorporate the learner in the design and development stage of the course along with the use of the learner during the formative and summative evaluation of the course.

Further Research

Further research needs to be conducted on how elementary students perceive visual design. The questions that still remain to be asked are:

- Do designers of Web Courses pilot their course with elementary students before implementation of the course?

- Do students prefer to use visuals to help them understand information being presented?

- What changes could be made to improve the visuals in the Web site, used in the study, from the students' perception?

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The White Man's Indian: Stereotypes In Film And Beyond

by Charalambos Vrasidas

Abstract

The image of Native Americans had been established long before film was invented, and with a few exceptions, it has remained the same since then. Film, because of its visual nature and mass appeal, played a major role in perpetuating the misconceptions about the Natives. Some of the most popular images were the *bad Indian*, the *good Indian* and the *noble savage*.

One of the methods that white society employed in an effort to isolate the Native Americans and make them a weak minority in their own homeland, was stereotyping. Stereotypes were created for three main reasons: (a) to confirm the superiority of Western civilization, (b) to perpetuate the myths on which the American nation was built, and (c) to offer entertainment through literature, art, and film. Stereotypes were very entertaining, and therefore, profitable.

Coming to America

When the first Europeans came to America they found a rich continent with a lot of resources. Here they wanted to create a society similar to that in their countries in Europe. The only obstacle to their plans was the indigenous people. In the view of the European settlers the Native Americans were hindering progress (Pearce, 1967). The Whites tried to civilize them and make them conform to the Whites' culture and values. Whites tried to educate the Natives, change their religion, and steal their land. Efforts to civilize the Natives were not successful. Therefore, the only way for white society to solve its Native American problem was to destroy the Natives (Berkhofer, 1978; Deloria, 1989; Pearce, 1967). It was alright for Europeans to become savages in order to save civilization; a white civilization that was opposed to the Natives values and beliefs.

The differences between Western and Native American civilizations played a significant role in the evolution of the relationship between the Whites and the indigenous people. "Indianness" and civilization were, according to the Whites, two concepts opposed to each other (Berkhofer, 1978). Native American cultures were more based on simplicity and mystery, rather than on abstract scientific knowledge. As Deloria (1989) stated, "the western hemisphere produced wisdom; western Europe produced knowledge" (p. 11). According to European Americans, white superiority, religion, and moral systems should have prevailed over the Native Americans and their culture. Whites soon realized that it was impossible to civilize the "savages." As Roy Harvey Pearce (1967) put it, "Americans were coming to understand the Indian as one radically different from their proper selves; they knew he was bound inextricably in a primitive past, a primitive society, and a primitive environment, to be destroyed by God, Nature, and Progress to make way for the Civilized Man" (p. 4).

Images and Stereotypes Before the Invention of Film

Lippmann (1961) defined stereotypes as "pictures in our heads" (p. 3). Before we see and experience the world, we take from society pre-defined images of the world in the form of stereotypes. Stereotypes, according to Marger (1994), are erroneous, overgeneralized images of groups of people which serve as the basis for several prejudices. In multi-ethnic societies, stereotyping is one of the techniques employed by the dominant group in order to maintain its dominance over subordinate groups.

Lippmann (1961) claimed that stereotypes serve as the defense of our status in society. More specifically he postulated that stereotypes are "the projection upon the world of our own sense of our own value, our own position and our own rights .... They are the fortress of our tradition, and behind its defenses we can continue to feel ourselves safe in the position we occupy" (p. 96). According to Lippmann (1961), any attack on the stereotypes is like an attack on the foundations of our status in society, on our values, and on our whole belief system.

Before the invention of film, a stereotypical perception of Native Americans was embodied in art, fiction, and entertainment events (Barnett, 1975; Berkhofer, 1978; Stedman, 1982). For a long time, white society treated Native Americans as objects of entertainment. An example of such treatment was the attachment of Sitting Bull to *the Buffalo Bill Cody Wild West Show* (Churchill, Hill, & Hill, 1978). Stereotyping and the creation of myths was an approach employed by white society for justifying the stealing of land from the Natives.

Slotkin (1973) argued that "printed literature has been from the first the most important vehicle of myth in America" (p. 19). Themes of Whites fighting against the "red devils" and usually outperforming them were essential for confirming the superiority of white civilization. In fiction, Native American's inferiority and savagery were constantly juxtaposed to the white man's superiority. Always the Whites overpowered the "savagery" and prevailed over the Native Americans.

According to Barnett (1975), Cotton Mather's (1699) *Decennium Luctuosum* is an example of early American fiction in which Native Americans are misrepresented and stereotyped. Mather's main focus was the captivity theme under which white settlers were captured by the Natives. In the book, Native Americans were paralleled with wild animals and demons with very strong primitive instincts.

Similar themes are abundant in the pre-Civil War frontier romance, the dime-novels, and nineteenth century fiction. Other examples from fiction come from James Fenimore Cooper's *The LeatherStocking Tales* and included *The Deerslayer* (1841), *The Last of the Mohicans* (1826), and *The Prairie* (1827) (Pearce, 1967).

There were a number of stereotypical characteristics depicted in works of fiction which Barnett (1975) called "red gifts" (p. 75). The body build, physical strength, height, excellent hunting and fighting skills, and the heavy accent were some of those characteristics. In addition to these "gifts", Barnett (1975) and Berkhofer (1978) identified three major kinds of stereotypes. These were the *bad Indian*, the *noble savage*, and the *good Indian*.

The *bad Indian* was hostile, savage, vengeful, and immoral. Images of *bad Indians* were abundant in the captivity genre in early fiction. The *good Indian* was usually friendly to Whites and was willing to share his belongings with the settlers, was a brave warrior, lived with simplicity, and close to nature. Usually, *good* were those Natives that gave up their culture and identity and became "white." The *noble savage* image of the Natives appeared in the captivity narrative because white society realized that it was responsible for the fact that the Natives were gradually becoming extinct (Barnett, 1975). The image of the *bad Indian* and the *noble savage* were usually in coexistence.

Churchill et al. (1978) identified three major themes under which stereotyping of Native Americans can be categorized. The first theme was, "the Native as a creature of a particular time," mainly between 1800 and 1880 (p. 47). This meant that thousands of years of history and civilization were usually compressed to under a single century. This period was a time during which the Natives were fighting for their lives and their land. For the Whites, this period was a time of their victory over savagery; it was the time of victory of Western over Native American civilizations.

The second theme was "Native cultures interpreted through white values" (Churchill et al., 1978, p. 47). Whites had a completely different culture. Trying to interpret Native American civilizations through western culture's values can only result in misinterpretations. These misinterpretations inevitably resulted in the creation of numerous stereotypes. It was convenient for white society to create a fictitious Native American identity closer to the white interpretation. This new identity was the same for all the Natives regardless of their tribal origin.

The third theme was "Seen one Indian, seen 'm all" (Churchill et al., 1978, p. 47). North America contained more than 600 different Native American societies which were speaking over two hundred different languages (Barnett, 1975, p. 72). The distinct differences among the Native American societies were never dealt with seriously. Instead, the perceptions of many people at the time, the Natives, no matter of what culture and heritage were all "ignoble savages".

The themes and stereotypes described so far were dominant in early American fiction. By the end of the nineteenth century, the most favorite theme in popular fiction was the Native American fighting in the Far West and dying in order for civilization to proceed (Barnett, 1975; Stedman, 1982). When film was invented the situation became worse for the Natives. A new powerful medium was employed by Whites that continued the process of miscreation of the Natives' image.

The Power of the Moving Image

In art, Native Americans had been sculptured or painted. In fiction they had been described with words. When film was invented, Native Americans were shown on screen, riding horses, screaming, killing, and scalping people. Because of its ability to present moving images, film played a major role in perpetuating the stereotypes of the Native Americans.

Film, like any other form of art, reflects the culture of the society and at the same time, contributes to that culture. It embodies the society's values, beliefs, and social structure and assists in transmitting culture to mass audiences. The complex relationship between film and culture is explained by Belton (1996) who stated that "the movies are an integral part of mass culture and are embedded within it. One does not produce the other; rather, each interacts with the other, and they mutually determine one another" (p. 1).

The film industry has played a significant role in shaping the perceptions of people towards different ethnic groups and in perpetuating the myths on which the American nation was built. Miller (1980) argued that Hollywood films "became a major transmitter of 'assimilationist' values and helped to reinforce a narrow conception of American life to which all groups were expected to conform" (p. xi). Film was a major force in creating the ideal image of what an American should be. Film industry dictated how Americans should behave, what they should believe in, and what they should look like.

Many scholars pointed out that people's perception of history are shaped to a great extend by images presented in film and television (Vidal, 1992; Seixas, 1994). For many people the two main sources of information are movies and television. Myths and stereotypes about Native Americans are alive today because television and film, as media with mass appeal, played a major role in perpetuating the misconceptions about the Natives. Film and television have the unique power of reaching mass audiences in an entertaining way. By presenting the stereotypical images of the Natives in an entertaining way, the shaping of the mass audiences' minds becomes even more effective.

Film was, and still is, a very profitable business, and like in any other business, the major driving force is money. Stereotypes were very entertaining, and as such, movies with stereotypical characters were well liked among the masses. Therefore, films with stereotypical themes were watched by big audiences, and consequently, were very profitable. Stereotypes were attached to several minority groups including African-Americans, Latinos, Asian-Americans, women, and Native-Americans.

Mythology of the Western Genre

The representation of Native Americans in films was mostly restricted to one genre, the Western. Because of the structure of the Western it was reasonable enough to stereotype Indians. Spears (1959) argued that the Western is a type of film that targets chiefly juvenile and unsophisticated minds. Hence, "it is natural that a stereotyped villain should have been the major representation of the Indian" (p. 18).

When the settlers began moving West, one of the major obstacles they confronted were the indigenous people. The frontier in Westerns was usually a place where an advancing European civilization clashed with "savagery." It provided a setting where the enjoyment of violent conflict would be justified without questioning the moral values of society (Cawelti, 1974). As a product of nostalgia, the Western led the viewers in constructing an imaginary civilization that attempted to replace those civilizations that were already in existence. The creation of a mythological West justified the seizure of land and the genocide of the Natives. This inevitably led to the formation of a new view of history which was mainly based on myths.

The Western was a type of American mythology. The mythologies that exist in a society are indicators of the national character. The myths that served as a foundation for the Western were reflecting the white society's values, beliefs, world view, and the desirable social structure. Slotkin (1973) argued that one of the major forces that shaped mythology in America was the wilderness of the land and its indigenous people. Another major force was the need to control this wilderness and get rid of the indigenous people.

In his book *The American West in Film. Critical Approaches to the Western*, Tuska (1985) identified seven basic plots around which the Western developed. One of these plots was the 'Indian story." According to this plot, "an Indian, an Indian tribe, or several Indian nations are either the principal focus of the story or the principal motivation of the actions of other characters in the story. Generally the law of miscegenation has applied, so while a white man might marry an Indian woman, she comes to die in the course of the story. Rarely ... an Indian woman might live and ride off with the hero; and even more rarely a white woman might choose to live with an Indian male and survive the end of the picture" (p. 31).

An example of the above plot is the movie *The Searchers* (1956) which was based on Robert Montgomery Bird's *Nick of the Woods*, written in 1837. After spending five years with a Native American chief, the white woman is "rescued" and the chief is killed. Very powerful was the dilemma that the Whites were facing before rescuing the white woman. Should she also die? After all, she lived with the savage for five whole years. Can she still be white? Questions of this nature were prevalent in many other Westerns.

The period during which most of Western plots take place, was from 1860 to 1890, because by 1890 most of the Native Americans had been either killed or placed on reservations. The Western genre was one of the most favorable among the masses and served as an everlasting source of myths on which a whole nation was built.

Brief Historical Overview of Images of Native Americans in Film

From the beginning of film history, there was already a large pre-existing body of images and stereotypes attached to the Native Americans. Filmmakers drew their material from the stereotypes that existed in popular culture. Native Americans appeared on the screen with the very beginning of film history. According to Bataille and Silet (1980), short films such as *Sioux Ghost Dance* (1894) and the *Parade of Buffalo Bill's Wild West Show* (1898) were shown by Edison's coin-operated machines.

Great early American directors like D.W. Griffith, played a significant role in building and perpetuating the stereotypes of Native Americans. D.W. Griffith, who is regarded as one of the first greatest film directors, shot many films in which Indians were the protagonists. Occasionally, individual Natives were depicted as "good" but the group was always presented as "evil." Bataille and Silet, (1980) cited *The Redman and the Child* (1908), *Ramona* (1910), *and The Battle at Elderberry Gulch* (1913) as examples of such films.

Very rarely did filmmakers use real Native Americans in their work. Because the Native Americans were the "savages," they have often been portrayed by stars of horror films like Bela Lugosi and Lon Chaney (Churchill et al., 1978). Occasionally, when real Natives appeared in films, they were mainly used as props to help create the appropriate atmosphere. Examples of the few successful Native American actors are Willie Rogers, Chief Dan George, Willie Sampson, and Graham Greene.

Aleiss (1991) argued that one of the few films ever made about Native Americans which depicted them sympathetically *was The Vanishing American* (1925). Although a silent film, *The Vanishing American* is one of the film industry's most powerful depictions on white society's exploitation of Native Americans. The film presented a very negative image of the missionaries. The importance of *The Vanishing American*, according to Aleiss (1991), "lies not so much in its accurate depiction of the misguided reservation system as in its ability to reveal the frustration of a society unable to resolve its Indian Problem" (p. 468).

From the time of WWI and on, the native's image became very popular in film, and for the next thirty years it remained unchanged. Film images represented the Native American often as lazy, savage, drunken, heathen, usually male, with no specific tribal characteristics and with no family relationships (Bataille & Silet, 1980; Berkhofer, 1978). There was a serious reason for why most of the times the Native American in the movies was male. As Deloria (1989) argued, Native American males have "too much of the aura of the savage warrior, the unknown primitive, the instinctive animal" (p. 3). This association of male Natives with savagism was very convenient for the Whites. It allowed the Native American's hostility towards Whites to be explained in terms of the Natives' animal instincts and only rarely in terms of a reaction to the white man's exploitation of the Natives.

Between 1951 and 1970 at least 86 Native American-Vs-U.S. cavalry films were produced and all of them were based on pre-existing stereotypical themes (Churchill et al., 1978). The war theme was always a favorite subject. The United States government signed more than four hundred treaties and agreements with the Native Americans. However, none of those treaties was ever kept (Deloria, 1989). Very rarely were the issues of treaties dealt with by the film industry in a way that would shed light on U.S. government's dishonesty.

The violence depicted in the Western was a great selling point. War themes evolved around the conflict between Whites and "savages" and had a strong appeal to audiences. By depicting human conflict at its utmost, war films are very emotional and engaging for the audience (Watt, 1988). Therefore, war films are well liked and watched by the masses. Stedman (1982) pointed out a parallel between the soldier-Vs-Native American movies with World War II movies; the Natives, like the Japanese and the Germans, needed to be exterminated. With the beginning of WWII the focus of the film industry turned towards making films about the war. Consequently, during this period the number of movies about Native Americans declined.

One of the most anti-Indian films ever made was John Ford's *The Searchers* (1956). The plot centers around the search for a little girl that was taken by Commanches, after they murdered her family. Ford portrayed the insanity that resulted from being captured by the Natives and he deliberately justified the killing of Natives. Actor Jeff Hunter played the role of Martin, the "half-breed" cousin of Debbie who was kidnapped. Martin, along with Debbie's uncle Ethan, played by John Wayne, spent most of the time in the film trying to rescue Debbie. In a very powerful scene, the hatred towards Native Americans is expressed by Ethan, who shoots a dead Native in both eyes. He then said that the Commanche warrior "will have to wander forever between the winds" and he will never be able to enter the spirit land. By using an actor with John Wayne's magnitude, Ford managed to justify the killing of the Natives.

In the movie *Duel in Diablo* (1966), directed by Ralph Nelson, the savagery of the Natives is also punished. One of the main ideas portrayed in the film was that there is nothing that can change the Native Americans from being savage. Therefore, they have to be killed. The movie postulated that there is no place for the Natives neither on the reservations nor in American society.

Before the 1970s, there were only few films that treated Native Americans in a sympathetic way. One of these films was Delmer Daves' *Broken Arrow* which was released in 1949. The story was about an Apache Chief and an ex-army officer who were trying to bring peace among the Natives and the settlers. It was the "first picture that asked audiences to take the Indian's side," and for this reason the Association on American Indian Affairs "gave it a special award" (Spears, 1959, p. 25-26). Although there was a more sympathetic depiction of the Native Americans in this film, *Broken Arrow* lacked authenticity. Spears (1959) argued that the leader of the Apache was dignified in a way that "he resembled a Harvard graduate more than an illiterate savage" (p. 31).

During the late 1960s and early 1970s there was an obvious change in the political and social situation in the U.S. mainly due to the Civil Rights movement and to the country's intervention in Vietnam. This was a period of awakenings in American society. The genocide in Vietnam resulted in the reconsideration of the Natives' genocide on U.S. soil. Films like *Tell Them Willie Boy is Here* (1969), *A Man Called Horse* (1970), *Little Big Man* (1970), and *Soldier Blue* (1970), indicated this shift of attitudes towards the Native Americans. Still, all these films have done very little in breaking the stereotypes and restoring the Natives' image.

Arthur Penn's *Little Big Man* (1970) also received some good reviews in regards to the film's representation of Native Americans. Chief Dan George, a Native American actor, rises to an important figure in the film. The killing of Custer and his troops is presented as a justified revenge for the atrocities the U.S. Cavalry had repeatedly committed against the Natives. George Armstrong Custer is presented as an "insane maniac". This depiction of Custer was in contrast to the glorified hero portrayed by Errol Flynn in *They Died With Their Boots On* (1941). This illustrates how the treatment of a Native American subject in the 1940s is different compared to the treatment of the same subject in the 1970s.

Michael Mann's adaptation of the James Fenimore Cooper classic, *The Last of the Mohicans* (1992) and Kevin Costner's *Dances with Wolves* (1990), are some recent films that deal sympathetically with Native Americans. This does not mean that they are authentic. Commenting on *Dances with Wolves*, Seals (1991) argued that the film presented Native Americans as being "very poetic and nature-loving" (p. 634). Furthermore, he pointed out that the men in the film "speak Lakota in the feminine form," and this because the screenplay "was translated by a woman, who also served as the primary linguistic coach" (p. 637).

The documentary film *Incident at Oglala* (1991), and the feature *Thunderheart* (1992) are two examples of recent films that make strong political statements about the exploitation of Native Americans by the federal government. The *Incident at Oglala* centers around the uprising at Pine Ridge Reservation in 1975, during which two federal agents were killed. *Thunderheart* also deals with the events at Pine Ridge and presents an inside view of the reservation system. Walton (1995) argued that, because these films did not receive the publicity that *Dances with Wolves* did, indicated that white society refuses to deal with its Native American problem.

Impact of Stereotypes

A Senate subcommittee in 1969 conducted a survey, which was part of a study on Native American education. After spending more than two years researching, the members of the committee found that to white society the Native American's image was the stereotypical lazy, drunken and dirty. Furthermore, the committee concluded that “the basis of these stereotypes goes back into history - a history created by the white man to justify his exploitation of the Indian, a history the Indian is continually reminded of at school, on television, in books, and at the movies” (Committee on Labor and Public Welfare, 1969).

Native Americans, with few exceptions, were never dealt as humans, people with there own history, civilization, and problems. In most instances, the audience watches them getting killed because of the "crimes" they committed. Consequently, according to Churchill et al. (1978), by the 1950s it was more than natural for Native American children to "cheer the cavalry when watching television or at the movies", since they did not want to identify with Natives because most of the times they were the losers (p. 49).

John Ford's *The Searchers* (1956) was used in a study conducted by Shively (1992). This study attempted to examine sociological models of how people use and interpret cultural materials and how minorities deal with cultural myths of the dominant culture. The participants in this study were 20 Native males and 20 White males living on a reservation. Both groups watched the movie *The Searchers*. The assumption behind this study was that viewers interpret movies according to their cultural experiences. One of the questions that the participants were asked after they viewed the film was: With whom did you identify the most? "60 percent of the Indians and 50 percent of the Whites identified with John Wayne, while 40 percent of the Indians and 45 percent of the Whites identified with Jeff Hunter" (p. 727). None of the participants identified with the Native Chief Scar, not even the Natives.

The impact of the Western on American culture was tremendous because it was widely viewed. Before the 1970s, the Western was a very well liked form of entertainment. Cawelti (1971) found that in Chicago during 1967, four major channels combined, were showing an average of eighteen hours of Western films per week. Images presented in movies are dominant in popular culture and they shape many other forms of representation. Consequently, images of the Native Americans in Westerns played a significant role in perpetuating the preconceptions about North America's first inhabitants.

The image of the Native American warrior had a strong influence in popular culture. Some of the many examples of the use of the native's warrior image are comics, cartoons, names of sport teams (Black Hawcks, Braves, Redskins), and military equipment (Iroquois helicopters). The fans of baseball team Atlanta Braves, use a “so-called Indian war chant” to salute their team and evoke images of savagery (Marger, 1994, p. 170). The image of the Native American warrior was already established and it was associated with strength and vigor. Therefore, it was justifiable to name military equipment and sports teams after Native American tribes' names.

Conclusion

The film industry has played a significant role in the misrepresentation and stereotyping of the image of the Native Americans. There are a few exceptions to the rule, but still the film industry has a long way to go for a more realistic depiction of Native Americans in film. Even the films that are supposed to be dealing sympathetically with the Natives are not as authentic as they should be. The film industry's interpretation of the Natives was not merely a result of its ignorance on the subject but also because of white society's inability to deal effectively with the Native American problem.

The stereotypical images of the Native Americans were a result of a systematic effort of misrepresentation that goes back four centuries. They were created to confirm the superiority of Western civilization and to perpetuate the myths on which the nation was build. Besides, stereotypes were entertaining and therefore, movies with stereotypes were very profitable.

For many people, the only contact they ever had with Natives was at the movies. The Western, as a film genre and as a type of American mythology, played a major role in perpetuating the myths and stereotypes about Native Americans. Images presented in movies are dominant in popular culture and they influence many other forms of representation. In order to restore the Native American's image, the myths and stereotypes on which the American nation was built, need to be confronted.

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Teachers' Perceptions Of Instructional Design

Ann S. Dana

Abstract

Over a two year period, in five sections of a ten week course in instructional design of software, sixty graduate students took part in the study. Students were surveyed using a six part questionnaire at the beginning and end of the course. The goal was to determine students' understanding of instructional design. The results indicated there was no awareness of design principles on the pretest. Twenty per cent indicated they did not understand the term compared to sixty-eight per cent positive responses on the post test. CAI software modules, designed by the students, showed better understanding of visual design principles than responses indicated.

Introduction

The development of the field of instructional design has covered many decades along with the field of educational psychology. As more is learned about how we learn, the closer we get to providing the best techniques for creating the instruction that will help each and everyone learn to the best of their abilities. Learning theories have changed considerably in recent years as we begin to understand more about how students learn. Shuell (1990) stated these insights into how learning takes place indicate that the behavior theory of learning is not applicable for student learning today. The author foresees new theories and procedures emanating if instructional design is to remain relevant to the learning that is taking place today. Jonassen (1995) stated that schools and universities must recognize the need to support students in active, constructive, collaborative, intentional, conversational, contextualized, and reflective learning.

The theory and practice of the instructional design system includes the categories of design, development, utilization, evaluation, and management (Seels, 1995). There is a need to integrate the instructional design process with outcomes based education. In helping teachers understand the fundamentals of instructional design this study used the definition by Shambaugh (1994) who stated that instructional design is: "A process which analyzes the needs of learners and designs structured 'possibilities' to address those needs." (p. 4) Instructional designers and/or instructors should determine an appropriate balance of structural knowledge and detailed knowledge acquisition. Detailed objectives prior to beginning a lesson and a reminder to pay close attention to relationships would help in understanding this knowledge (Beasley & Waugh, 1996).

User or Audience

Instruction begins with the analysis of the prospective user or audience. The importance of the learner or user has also been noted as an important element of the design of instruction by both Apple (1992) and Microsoft (1995) development teams. Identifying and understanding your audience are the most important first steps in designing your product (Apple, 1992). Designers must let go of their own feelings, desires and experiences and strive to see through the eyes of the user (Howlett, 1996). This may mean studying the people in the target group, thinking about where they work, tools they use, limitations they deal with. "A well designed user interface is built on principles and a development process that centers on users and their tasks." (Microsoft, 1995, p. 3). It is one of Gagné's elements of instruction (Gagné, 1987). Considering the user is necessary in the design and development of any type of instruction. It is essential to the design of software that the interface makes the information in the program readily available to the user (Jones, Farquhar, & Surry, 1995). Teachers are involved closely with learners daily. Taking a closer look at the learners' characteristics is a major element of instructional design. The project to be developed by the teachers, as students and consequently as designers, was to be an interactive learning environment. The teachers had to understand that the learners would be making decisions, choosing directions, puzzling over options, and accepting the consequences. Schweir (1991) cautions that if the interactive environment is to be useful, the motivation, that builds the learner's desire to learn from the content, must be a key concern. Many considerations need to be addressed, such as prior knowledge of the learners, integration of new knowledge with existing knowledge, organization of concepts to be learned, differences in learner familiarity with content, how knowledge improves, how learning improves, how to improve transfer, benefit of feedback, how to prevent confusion, and how to adapt to individual learners. It is essential that a designer needs to have a firm understanding of instructional design before developing software.

A model should show the strong correlation between the teacher and/or designer and the three major components:

- The Who, the learners and their characteristic;
- The What, the content and objectives of the subject matter within the curriculum;
- The Where, the learning environment including what we know of learning theory along with the needed elements of instruction and design principles.

There is a need to gain a greater understanding of how we can bring the worlds of instruction and instructional design closer together.

Teachers' Role

What meaning do classroom teachers, as graduate students, bring to the term instructional design? What significance does it have for them? Do teachers feel differently about the importance of instructional design after taking the course? The purpose of this study was to determine what teachers' current perceptions were of instructional design and if this required course had any affect on their understanding. Because the teachers used hypermedia authoring software to demonstrate their knowledge of instructional design, did they also show a greater understanding of the design elements needed for effective instruction?

Teachers have many strengths including planning a course of study, evaluating and locating instructional materials, developing more materials if needed, handling administrative detail, plus evaluating student progress and keeping records, and keeping parents and administrators informed of the students' progress. Above all it is their job to teach. Teachers' perceptions of what they know about new ideas, equipment and materials is hampered by lack of time and experienced help, but also experiencing frustration easily (Hannafin & Peck, 1988). Teachers' beliefs in how students learn is the key to the approach in using technology in the learning environment. Giving guidance to teachers in workshops or course work should revolve around what the teacher already uses as methods and strategies in the classroom. The instructor can then model or guide the teacher into how technology would support what this teacher already believes (Dana, 1993).

Design of the Study

Five groups participated in the study. Sixty graduate students, taking a required course titled Instructional Design of Software, while pursuing either a Masters or a Certificate of Advanced Study in Technology in Education at the National College of Education at National-Louis University, participated in the study. The majority had no prior experience with hypermedia authoring software. While those who had prior experience might be considered to have an advantage, they were all on equal ground in the development process.

Procedure

The setting was a ten week course on instructional design of software. Each class session was three hours once a week and students would need to spend three to nine hours of preparation time prior to each class. Longer preparation time was needed during the development cycle. Part of each class was spent in discussion of the readings for the week. These documents gave background information in instructional design theory and in practical uses of hypermedia. Instructional design theory was the essential basis for this course. The course included two basic sections, instructional elements (gain attention, state objective, stimulate recall of prerequisite learning, present stimulus material, provide learning guidance, elicit the performance, provide feedback, assess performance, enhance retention and transfer) (Gagné, 1987) and design principles (define users, state purpose, presentation methods are logical, easy navigation, clear introduction, layout consistent; and text, graphics, and audio appropriate and integrated; and no glitches) (Apple, 1989).

Students also analyzed commercial CAI software using an instrument that dealt with their awareness of these instructional and design elements inherent in the software. There were practice sessions with the hypermedia authoring software as they were planning and critiquing each others' designs for a CAI software module that incorporated as many of the instructional and design elements as were needed. The final class session was dedicated to the participants presenting their CAI projects with documentation. Peer editing and evaluation were continuous throughout the developmental process as well as in the final analysis. The following criteria were used in the final evaluation to show their understanding of the instructional design process:

Title Screens - title, byline, instructions, instructional goal, objectives, navigation aids, introduction to the user.

Menu - clear, concise, instructions, navigation aids, one selection on menu completed.

Instruction Screens - consistent design framework, precise functional areas, good use of all design principles, positive feedback.

Good balance of graphics, text, sound, animation, appropriate metaphor, and consistent navigation tools throughout.

Instrument

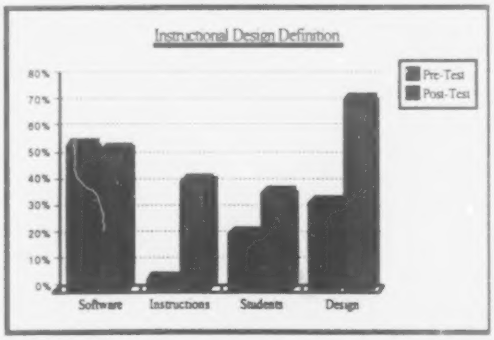
A six question pre/post questionnaire was developed and administered to the participants (see Appendix). The purpose was to determine the participants' understanding of instructional design and how it was used in their teaching. Also included were questions concerning the course, its purpose, and the benefits to their teaching. The first question concerned what the participants felt were important criteria in software that they would or could use with their students. Questions 2 and 3 will be discussed in this paper, along with the examples of how instructional design was demonstrated in their projects.

Data Analysis

The responses to the questionnaire have been analyzed using the Data Collector, a HyperCard program that allows narratives to be entered and analyzed for key words or phrases (Turner & Handler, 1992). Topic cards were created for each of the key words. The topic cards were further analyzed with other key words assigned. Comparison of the pre and post responses were done for questions 2 and 3. Three topics were chosen to be compared and graphically presented for these two questions on the pre and post tests.

Figure 1 shows the participants' responses to question 2. Even after the 10 week course, the design, creation, or evaluation of software was not dissimilar. However, in reading the narratives on the survey, greater differences were apparent for the same respondent.

Figure 1
Instructional Design Definition
Pre/Post Test Comparison



The definition as described on one pretest stated, "How the software is designed to be used in an instructional setting." The post test for the same participant stated, "The design of lesson materials has design elements incorporated which facilitate learning."

A second example for the pretest ID definition revealed, "A design that will enhance learning and foster student productivity. I have tons of drill and practice software, but I feel my students need to get more involved with multimedia and start generating questions and finding answers for those questions. I don't want software to do my job, but I want it to help me do a better job." The post test definition for this participant was, "A piece of software that has been designed to enhance instruction or the learning of concepts. However, the design should be motivational and easy to navigate in; the context should be clear & consistent; it must state its purpose and how to use it; text, graphics & sound should be integrated. But most important, it must simulate the real world & encourage the students to interact with it."

Comparison of the responses for design and design principles related much greater concern for the use of design principles on the post test. Both of the post responses above show the recognition for their use. All of the responses on the pretest mentioned design only in relation to 'designing software' and not what elements were needed to make it effective, as is seen in the pretest response for the second participant. Instruction was more important to the participants after the course than prior. The difference in the importance of students to instructional design was greater on the post test. One participant did not respond to the question on the pretest.

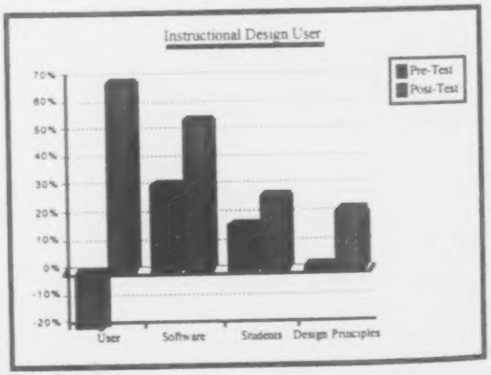
The third question asked the participants to answer and explain if they were users of instructional design. The terminology drew a blank on the pretest for twenty per cent of the respondents while sixty-eight per cent indicated on the post test they were certain they were users. The first example of the responses shows what a powerful amount of understanding was achieved over the duration of the course while a second respondent realized instructional design has a place within the planning of all instruction.

A participant answered, "I'm not really sure" on the pretest, but elaborated on the post test with, "Yes, because we learned the different elements of design in class and incorporated these into the program designed for class. Now, when I see a new software program I ask the questions from number 1," which stated "1) Is the software appropriate for the age of my students? 2) Is the title screen clear and self explaining? 3) Is the user in control? 4) Is "help" easily available? 5) Is there clear documentation? 6) Do students get appropriate feedback? 7) Is there consistency from screen to screen?"

A second example of response to the pretest was, "Yes. I 'design' my lessons to accomplish my goals and meet my objectives, to be interesting, and to be 'user friendly'."

On the post test this same participant wrote, "Yes, now, however, I am more conscious of design as it applies to everything! I find myself analyzing my lessons, TV commercials, - you name it. I'm always thinking about how it could have been better."

Figure 2
Instructional Design Users
Comparison Of Pre/Post Test Responses



Projects

Most of the projects the teachers presented showed a solid understanding of the design principles. It is important to look at this aspect of the study. Do the actual projects show more of what the participants learned about instructional design than the narratives reveal? Since the teachers used hypermedia authoring software to demonstrate their knowledge of instructional design, did this medium provide the vehicle needed to show their understanding of the design elements needed for effective instruction?

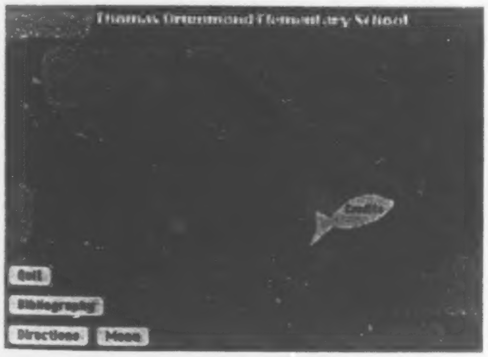
Background information on CAI (computer assisted instruction) was given to all students. Analysis of commercial software, where aspects of design elements were discussed, preceded students planning and executing their designs. The planning included analysis of the users, selection of content, listing objectives to be incorporated, and planning screen designs which were peer edited before execution on the actual screen.

CAI software should be interactive, friendly, motivating to the user which may include using a guiding metaphor to make the software more intuitive for the user.

Title Screen

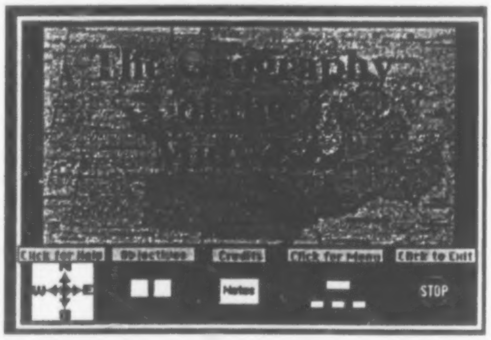
Title Screens were to include the title, byline, instructions, instructional goal, objectives, navigation aids, introduction to the user. The following figures are examples of how students incorporated the requirements:

Figure 3
Title Screen



This example of a title screen included appropriate graphic to the title. The font was legible. The metaphor was the pond within the school, the brick wall representing the school. Included were buttons to access credits, bibliography, directions, and the menu. The purpose was included under the title. Information on what the user was to do was included. It is not enough to include just icons, words are needed for clearer understanding (Howlett, 1996), as in the following example of a title screen. The metaphor of using a map for motivation relates well to the topic and to the age of the users.

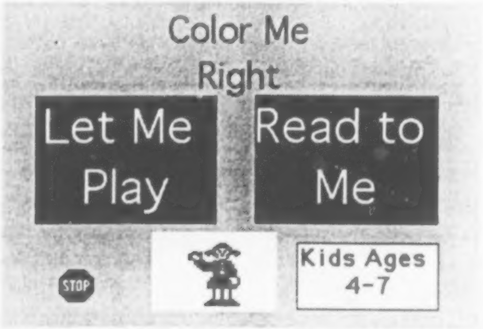
Figure 4
Title Screen 2



Menu Screen

Menus were to be part of the projects. Students were required to make certain that the users had a choice of the path to follow and were to include clear, concise, instructions, and navigation aids. The graduate students were to follow one selection on menu to completion.

Figure 5
Menu Screen



This example of a menu screen for an early learning project included all directions using the audio capabilities of the authoring software which were read when the mouse passed over the large button area. Primary

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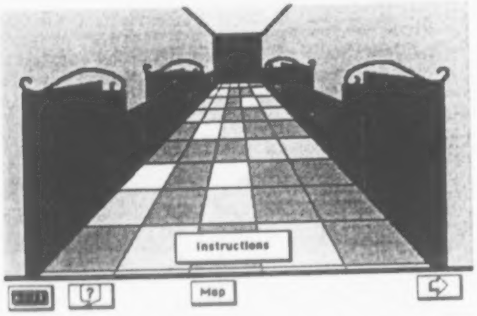
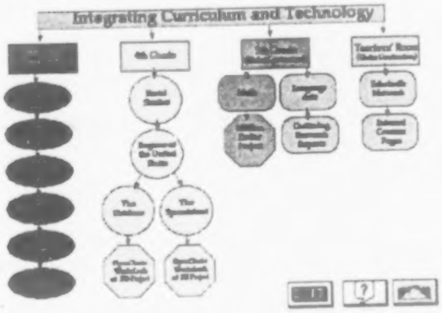
colors of red and blue with a yellow background were appropriate for the user's age group and the content. The title of the program was included. The stop sign was a familiar icon for any age group, but the word stop was also included.

Figure 6
Menu Screen 2



This menu incorporated a school hallway as the continuing metaphor used in the project. This project was developed for teacher use. The button map took the user to a concept map that showed the relationship of all screens. This is a navigational aid that gives the user control over their location in the program.

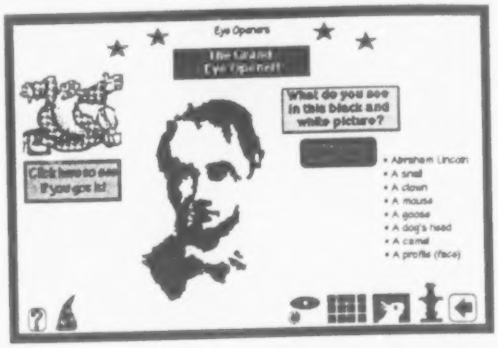
Figure 7
Concept Map



To navigate effectively throughout a stack, the users must know their options. Five user needs should be addressed:

- context, what is it about;
- location, where is user now;
- destination choices, where can user go;
- travel methods, how will user get there;
- progress indicators, where have users been (Apple, 1989). The following example displays icons appearing to the left of the arrows that represent previously visited locations. Users can return to any of those locations by clicking the icon.

Figure 8
Location Icons



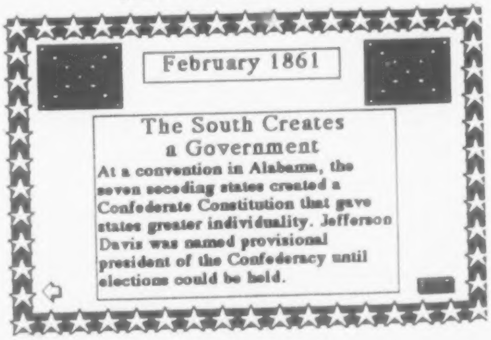
What do you see in this black and white picture?

- Abraham Lincoln
- A snail
- A clown
- A mouse
- A goose
- A dog's head
- A camel
- A profile (face)

Instruction Screens

The student designers were to select one item from their proposed menu and complete a module that would include instruction and a way for the user to check themselves on the information. The instruction screens were to include consistent design framework, precise functional areas, good use of all design principles, and positive feedback for right or incorrect responses. The content area the students chose had a great influence on the way the information was projected.

Figure 9
Information Screen



February 1861

The South Creates a Government

At a convention in Alabama, the seven seceding states created a Confederate Constitution that gave states greater individuality. Jefferson Davis was named provisional president of the Confederacy until elections could be held.

The information presented to the user includes text in red. Previous instructions to the user informed them that more information would be given if the red text

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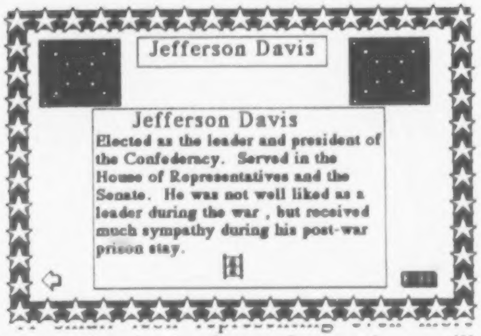
were clicked.

Figure 10
Response to Hot Text



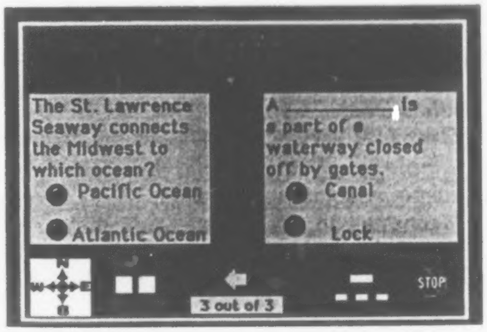
Jefferson Davis

Jefferson Davis
Elected as the leader and president of the Confederacy. Served in the House of Representatives and the Senate. He was not well liked as a leader during the war, but received much sympathy during his post-war prison stay.

information in the form of a movie or still picture is accessed by a click.

After information is given students can take a quiz to determine if they have gained the information. To be usable to the teacher, a management system would be included. Where a teacher merely wants students to check themselves, simple non-graded evaluations can take place. The user should receive positive, helpful feedback whether to a right or a wrong answer. The following is an example of a question and answer covering what they were informed about the Midwest.

Figure 11
Quiz

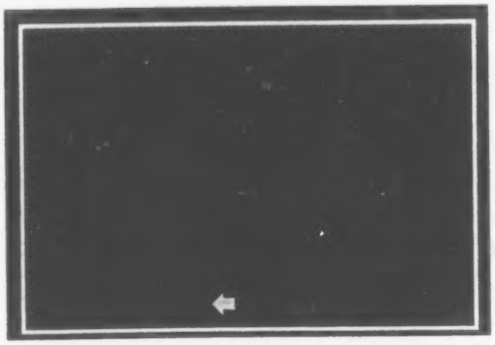


The St. Lawrence Seaway connects the Midwest to which ocean?
● Pacific Ocean
● Atlantic Ocean

A ________ is a part of a waterway closed off by gates.
● Canal
● Lock

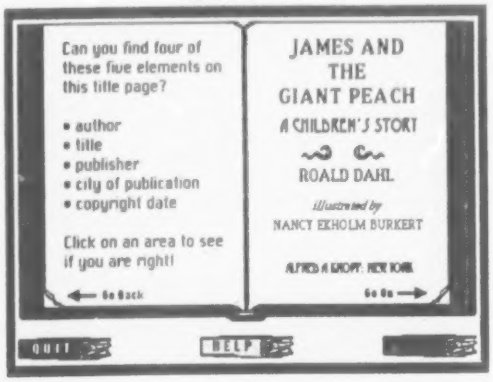
Appropriate feedback should be non-threatening, immediate and informative. It should be free from elaborate praise of correct answers and free from rewards for incorrect answers. It should also be relevant for the particular users.

Figure 12
Positive Feedback to Incorrect Response



A self check can also be made by the designer giving an example and asking the user to see if they can find examples. They can go back and reread the instructions if they cannot recognize the elements or parts.

Figure 13
Self Check



Can you find four of these five elements on this title page?

- author
- title
- publisher
- city of publication
- copyright date

Click on an area to see if you are right!

JAMES AND
THE
GIANT PEACH
A CHILDREN'S STORY
ROALD DAHL
Illustrated by
NANCY EKHOLM BURKERT
ALFRED A KNOPF · NEW YORK

Discussion

Design principles were not very eloquently described in most post test questions, but there was awareness that was not apparent in the pretests. Software's relationship to instructional design was very apparent. Students were also important in the design process. One participant wrote on the post test for the question as to how the course would impact her teaching, "I now am very confident in what I am looking for in software design, etc. this can only impact my teaching and my instruction in a positive way. I can design

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my own program to address the needs of my students. I do not have to search for a program that may meet some of the needs. I can design my own program to reinforce anything that I may teach in class. This will really impact my instruction and the learning that will take place in my classroom. I have enjoyed this class immensely and feel it was well taught. I see myself using this in my classroom and have ordered HyperStudio for my class for the next school year. My students will be so excited to have the opportunity to present using different criteria. This can only make my life as a teacher more enjoyable. Having motivated, excited students in your classroom will have a direct impact upon my teaching. I will begin to have fun again along with my students. What I have learned in class affords me the creative opportunities that I so enjoy."

It is little wonder that teachers do not recognize that there is a correlation between developing instruction and instructional design. Earle and Sheffield (1995) stated that there are discrepancies between the roles and needs of teachers and the requirements of the instructional design process. In essence teachers plan mentally; designers create detailed plans on paper. Teachers use already prepared materials; instructional designers don't accept them. Teachers focus on instructional activities; instructional designers focus on the process and the product. It takes a great deal of time to process a design; teachers lack the time. The sampling of the teacher responses makes this apparent.

Responses to all questions found software to be the dominant response within the narratives on the teacher survey. As these teachers are enrolled in a degree program in technology, they would possibly assume software would be involved. Further research may shed light on why they do not all recognize instructional design as part of their daily planning. The survey could include questions concerned with the recollections of their educational background, when and where they learned to prepare instructions. Survey question 6 narratives revealed the direction they hoped to go or would go after the course experience. 40% of the participants found it would directly affect their teaching. One such response, "I think my teaching strategies will change somewhat even if I'm not working on computers. We studied characteristics of the user; well in a classroom they are the learner, visual, tactile, etc. and as a teacher, you must remember all your students are different and on slightly different levels." Another further justified the impact, "...as I prepare class lessons and activities I keep in mind effective instructional design."

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Appendix

Questionnaire

1. If you were responsible for selecting software for your classroom, list the criteria you use.

2. When you hear the term instructional design, what does it mean to you?

3. Do you perceive yourself as a user of instructional design? Explain your answer.

4. What do you see as the relationship between your answer to question 2 and the design of the software used in your classroom?

5. Describe what you think you will be discussing and learning in this class. (pretest)

5. What relevance does what we discussed and learned in this class have on how you develop instruction. (post test)

6. Based on your previous answer, do you expect this course to have an impact on your teaching? Please, explain your answer.

Visual Exercises:
A Quest For Alternative Measures Of Student Learning
by Robert Sitz

Abstract

You may have heard the refrain "... but I can't draw!" This appears to be a frequent lament when students are asked to execute an illustration, T.V. storyboard, or a visualization exercise. The reality is that all students can draw; drawing is a useful exercise; and there is much to be learned from this type of visual mediator. Theory, empirical evidence, and exercise results in the context of individual differences and information processing is discussed.

Although many students simply do not visualize or draw very well, most students have capabilities and potentials that they, and perhaps their professors, are overlooking. Drawing can be an extremely useful classroom activity for a variety of reasons, and this paper will demonstrate that there is much to be learned from this type of learning mediator.

Any college-age student has the capability of rendering simple stick figures or outlines of shapes. As young children, they were introduced to art by learning to copy simple shapes such as geometric figures (squares, circles, rectangles) or letterforms as a precursor to learning how to print. Many times, the young child was asked to outline a map as an aid to learning about the world. Then they moved on to the use of circular, ovoid, and stick-like representations of people and things; to creation and repetition of basic representational formulas. Finally, some detail was added to their drawings, including conventions that were learned for space and motion. Increasing degrees of visual correspondence to the shape, color, and spatial location of objects marked the upper elementary years (Feldman, 1970). Granted, not everyone had the benefit of formal art training, but drawing experiences are an integral part of most elementary curriculums. Such a wide use of the term "drawing" may seem strange, but it is common. Wherever the essence of the task is to work with lines and shapes on a flat surface, the word "draw" is the usual referent (Goodnow, 1977)!

Background

Once elementary representations are mastered, it may be that drawing becomes progressively less of a learning tool as one moves through the educational system. But there is some evidence to suggest that those earliest childhood experiences with drawing are better retained than is generally thought. In an advertising principles class, as part of an introduction to the creative process, this professor has asked students to participate in associational fluency exercises. In one such experience, students were asked to render drawings in response to a two word verbal cue, "pop bottle." The drawing results pictured (Figure 1) reveal a range of skill, but what is significant is that students are definitely successful at rendering intelligible illustrations and in many cases embellishing them with contextual detail.

In a second, follow-up exercise, students were asked to respond to the verbal cue Coca-Cola. As can be seen in the accompanying example pictures (Figure 2), greater visual elaboration is evident in their drawings. Most students have added detail and scenario. Again, a wide range of skill levels and quality is evident, but all students appear capable of at least a modest level of draftsmanship.

It should be noted that prior to the exercise (two days earlier), a formal presentation of a reel of Coke commercials covering a forty-year plus period of history had been presented to the class. This ensured that all

Figure 1 Examples of Three Different Student Drawings of "Objects"

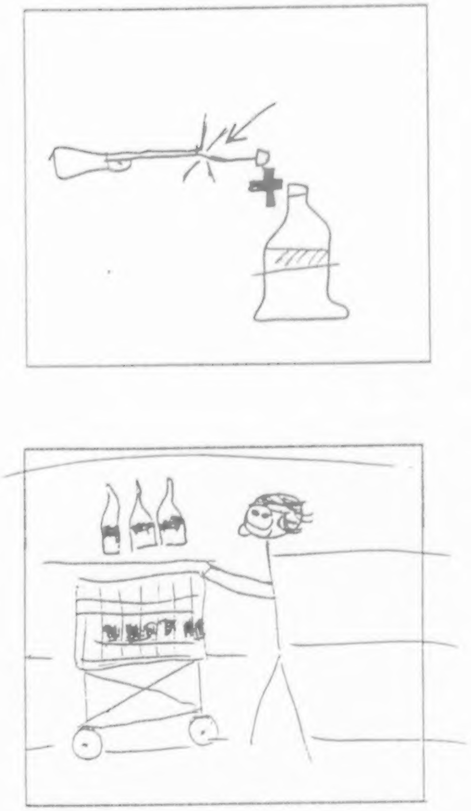


Figure 2 Examples of Student Drawings in Response to "Coca Cola" Verbal Cue

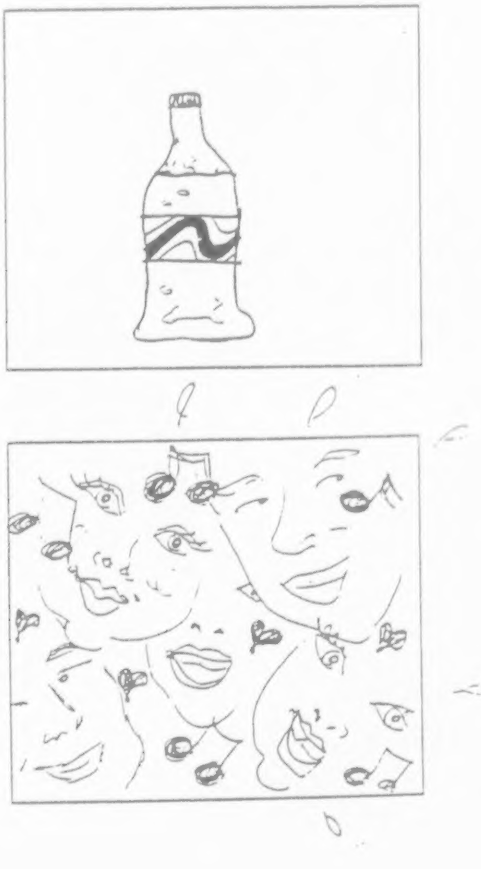
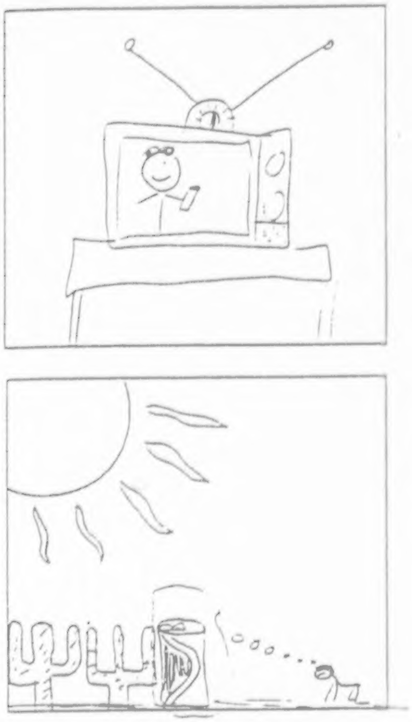


Figure 2-A: Additional Drawings to the Coca Cola Cue



students had some experience with Coca Cola imagery, even if it is possible that they had little background otherwise. This point will become more significant.

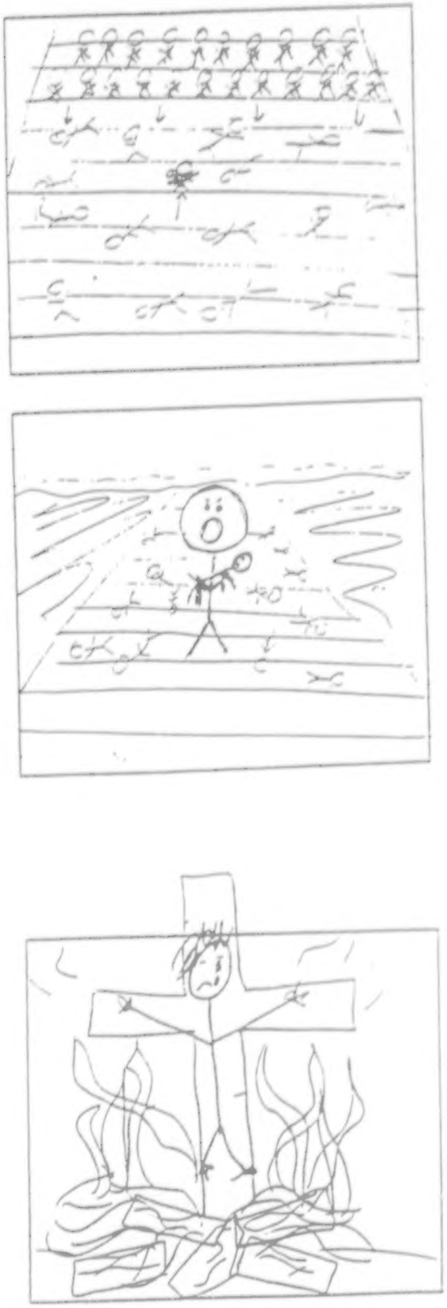
In a graphics and visual communications course, the film "Battleship Potempkin" (1925), edited by Sergei Eisenstein, was presented for viewing to demonstrate the editing concept called "quick cutting". "The Seventh Seal" (1956) by Ingmar Bergman is also shown and discussed. During follow-up class periods, students are asked to participate in a "visualization exercise" where they have to recall and draw their favorite scene from the film. Sample drawings from the study suggest that memory is vivid, and that most students are able to clearly express themselves through drawings (see Figure 3). The level of detail recall is intriguing, and of course in this case, none of the students had prior knowledge of the subject matter or the film. It should be apparent that the assignment was considered more challenging than rendering pop bottles! Prior experience with the imagery, unlike the Coca Cola exercise, was not a factor here.

Empirical Evidence of Drawing Acumen

In a related formal experiment, 234 post-secondary level students (Freshmen/Sophomores) in English composition courses in a large metropolitan community college participated in a study that utilized drawing responses as the dependent measure. Students were asked to read a lengthy art history passage (1500 words) which was accompanied by photographs and illustrations. The subject matter was complex and the information density of the text was high. The textbook-like passages referred the reader to pictures and illustrations accompanying the assignment (see Figure 4). The visuals were included to provide further description and explanation of the subject matter about Greek vases. At the conclusion of a twenty-minute reading and studying the assignment, the student subjects were given time to draw what they had seen and remembered about the text and pictures.

Over 90% of the subjects provided usable drawings that reflected their accurate recall of the topic. The level of recall detail depicted in the drawings was quite surprising given the complexity of the subject (see Figure 5). Considering the predetermined lack of student background about the subject matter and their inexperience in art, the drawings results were impressive (Sitz, 1990).

Figure 3 Student Drawing Examples from Film Battleship Potempkin and the Seventh Seal



What Can Be Learned from Drawings?

Scholars involved in the psychology of art, perception, imagery, learning and memory have long had a stake in understanding both the process and the outcome of "children" drawing. Some see works of "art" as a reflection of very general phenomena of human life. Drawings and paintings may be regarded as an expression of our search for order in a complex world, as examples of communication, or more specifically as an indication of aspects of human development and skill. Drawings can also provide insight about the nature of thought and problem-solving (Goodnow, 1977).

Rudolph Arnheim is a seminal figure who has long used art to analyze visual perception and visual thought (Arnheim, 1966, 1969, 1974). In a recent article (1993), he alludes to an essay by Gabriela Goldschmidt titled "The Dialectics of Sketching" (1991) in which the author undertakes to answer the question of "What kind of reasoning" sketching (drawing) represents. It is suggested that sketching is not simply a matter of representing on paper the images that are held in a designer's mind, but rather it is a dialectic process that brings about a gradual transformation of information. The outcomes of this dialectic process could be revealed in the information content of drawings. This is a topic for future investigation.

The study of visual perception may be the most successful area of experimental psychology with steady progress made over the past 100 years. Although there has long been very sophisticated understanding of the nature of many visual phenomena, it is only recently that specifics about the processing of high level visual information has been possible. Today it is known that high level

Figure 4 Textbook Photographs

Geometric and Orientalizing Styles (800–600 B.C.)

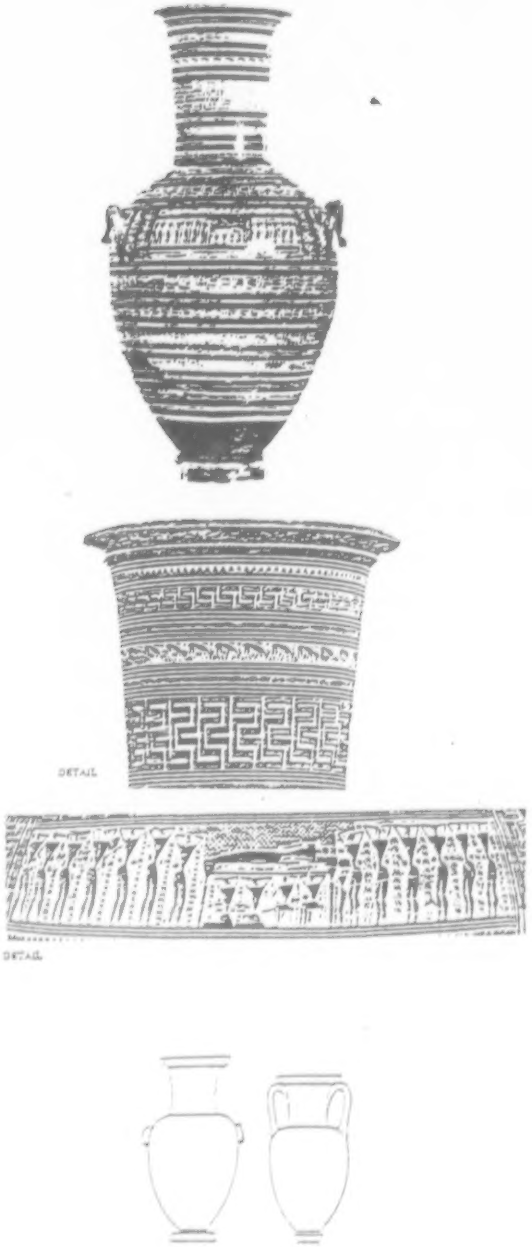
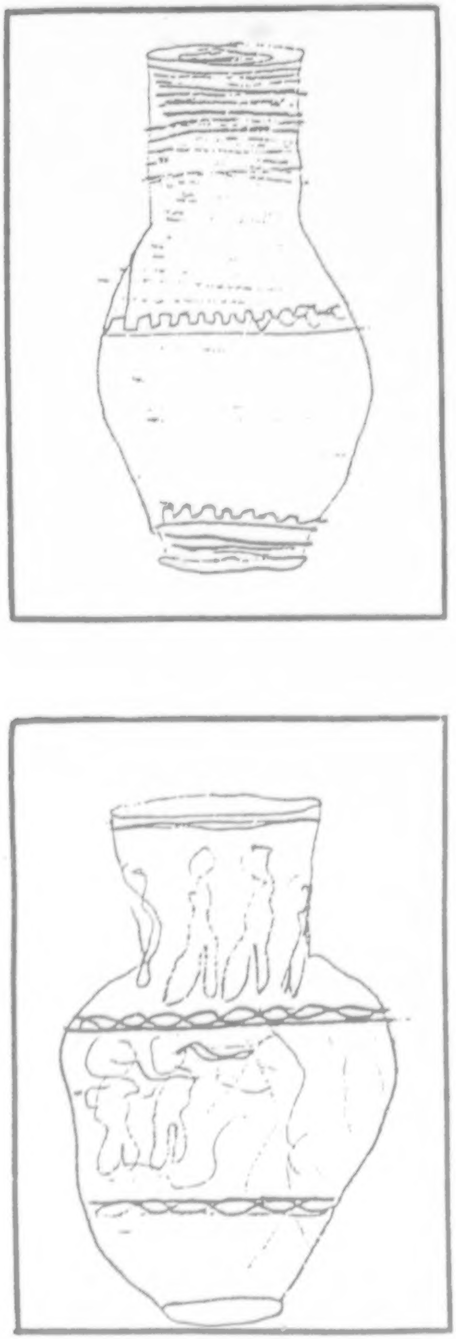


Figure 5 Examples of Student Drawing Responses and Recall of Complex Reading Subject Matter.



visual processing relies on previously stored information about the properties of objects and events. In general, "high-level" information processing refers to cognitive dimensions of perception. It is believed by some that if a theory of high-level cognitive perception can be developed, considerable leverage in understanding imagery will be achieved (Kosslyn, 1994). Therefore, one recent concern of the research on visual information processing has been imagery production.

In terms of advertising, visuals have been thought to act either to retrieve memories associated with brands or as mnemonic devices. The function of images has therefore been tied to memory rather than to imagination. This orientation continues to have impact since imagery production is conceptualized as the retrieval and manipulation of real objects and experiences. According to Scott (1994), the imaginative visual itself is yet to be considered, ". . . nor has the link between notions of 'image,' 'imagery,' 'imaginary,' and 'imagination' been explored" (MacInnis, 1992). In the previously alluded to non-scientific classroom experiences with the terms pop bottle and "Coca Cola," the drawing evidence fails to reveal whether the elaborate pictorial contexts are the result of memory, imagination, or some interaction. But perhaps for classroom purposes, resolution of the issue is not important.

What appears to be most significant is the realization that student participation in the processing of complex symbolic visual materials like illustrations, photographs, and advertising messages requires cognitive participation and the reliance on learning. Additionally, objects are translated into drawings by the process of representation using certain conventions that have been learned (Gombrick, 1960). What is evident is that these students are not just seeing, but they have learned how to see and what to see to various degrees of expertise and preference. Their attention to specific types of information detail is revealed to some extent in their drawings. Somehow, they have selected certain dimensions of the subject matter, probably determined by a combination of what they have learned and know, what they believe and want. The type of sensory input provided in the classroom exercises has evoked a variety of responses in the form of different images revealing probable individual differences in experiences, attitudes, interests and quite possibly such physiological characteristics as eye-hand coordination and ability to concentrate (Berger, 1989).

It has been argued that imagining and seeing are fundamentally different. That "cognitive maps" and "object schematics" that appear as images when they are standing alone are really parts of a perceptual cycle that includes many ongoing activities. People are "seeing" because they elect to select out parts of the perceptual cycle. On the other hand, where the object stands alone, it is imagining, not seeing. However, anyone who has to make mental preparation to pick up information specifying particular detail about certain objects must be able to imagine that object. The exercises described herein require just such preparation by the students. Whatever the activity, seeing or imagining, the ability to "divide, detach, and manipulate our own anticipations is immensely important." In Neisser's words (1976), these are the fundamental operations in all higher mental processes. Imagery expressed through drawings may be one example revealing ability as it pertains to the so-called "higher mental processes."

Individual Differences: Implications

One of the many objectives of education is the cultivation of critical thinking. The development of perceptual and cognitive skills that enhance the students' ability to critically examine visual information is a worthy goal, particularly as it relates to inducing students to learn about the details that drive the visual impact and memorability of subjects like advertising. Students learn to see the nuances of good advertising design versus poor design, the detailed flourishes that are the sign of differences between serif and san serif typographic styles, or the distinctive shapes that define corporate graphic marks. But, individuals differ in their information processing habits relative to perceiving, thinking, problem solving and remembering such details. One hypothesis is that some individuals are better able to separate out detail information from an overall context through analysis and structuring than are others. It has been suggested by the Cognitive Style theory of Field Independence-Field Dependence that people will differ significantly in terms of thought strategies when recalling information. For example, Field Independents are thought to be able to identify important visual cues regardless of whether or not they are made salient. On the other hand, information recall is hindered in the case of Field Dependent individuals if visual cues are not obvious (Witkin, et al., 1977; cited by Moore, 1985).

In advertising, of course, a variety of design techniques and visual cues "help" the consumer access the priority (or importance) of information elements. This is accomplished through subtle means like emphasis, eye gaze, sequencing, and other cues that are salient -- like arrows. However, in the classroom learning environment, the variety and density of information should be, and usually is, much greater than is evidenced by the typical 30 second advertising spot or print advertisement. The point being that external structuring and organizing of information by the instructor or textbook designers could be even more important, particularly as it might relate to Field Dependent students. Drawing exercises have the potential to force students to critically examine and concentrate on information, and at the same time to varying degrees reveal the nature of the information the student processes. Is the student processing the critical information that has been cued by the instructor, or is the student attending to extraneous matters that may interfere with learning?

Conclusion

The use of visual imagery as a form of learning mediation has attracted increasing attention in recent years with studies by Paivio (1986) and Kosslyn (1994), and others. Although the concept of imagery remains controversial in memory research, it is apparent that we have moved beyond reliance on introspective self-reports. Drawings have been used frequently in memory experiments, and by inference, it would appear that they could have a niche in the classroom alongside verbal measures of student knowledge and understanding in addition to what they may yield in regard to understanding imagery.

What is intriguing about student drawings is that they appear to have potentials beyond the strict measurement of imagery vividness or memory about objects and other specific referents. Many of the drawings come with context provided by the composition's background. In some cases, the context helps to clarify the learned referent the student was inadequate to the task of rendering through drawing skill. Where the student is unable to select the symbolic drawing conventions necessary to depict the object properly, supplemental illustrative background can help to clarify intended meaning. In other words, contextual background helps the viewer to understand the "message." Student drawings are often submitted embellished with background detail or with verbal balloons, captions, and other notations (even when the instructions are "not to use words"). The background or contextual information is interesting and in some ways revealing in regard to student interests, sense of humor, attitude, and so on.

The most obvious and long-standing justification for the use of drawing exercises in the classroom has to do with creativity. Image generation has been likened to a kind of attentional priming in which the representation of an idea in associative memory is accessed. Visual images are somehow generated when we recall previously seen objects or events, or when "objects" are combined in novel ways, or when patterns that have never actually been seen are "mentally drawn" (Kosslyn, 1994). Students certainly differ in terms of associational and ideational fluency as measured by verbal tasks. One can presume that similar findings could prevail in terms of "associational" and "ideational" fluency as it pertains to drawing exercises.

In advertising, it is taken for granted that good copywriters and art directors have excellent visual imagination and "fluency." Writers paint pictures with words, so being able to see products, people, and scenes in the mind's eye is important. Designers must be able to manipulate the elements of a print layout or sequence the frames of a T.V. commercial, visualizing the desired outcomes (Wells, Burnett, Moriarty, 1995). So as part of the preparation of students for these professions, it would seem to be axiomatic that drawing exercises would be an on-going part of classroom activity. Even if the student aspires to professional activity outside the creative sphere, it would appear that the kind of thinking and use of the "mind's eye" that is inherent in drawing exercises would be beneficial. Creative problem solving, planning, strategic thinking, and decision making require use of the higher order visual perceptual processes.

Summary

It is clear that all students have the ability to render coherent representations of both real and imaginary "visions" through the act of drawing. The process of creating "art" requires the use of critical thinking skills, visual imagery and memory. Drawings can be revealing in terms of individual differences in information processing, creativity, attitudes, personality and talent. Empirical evidence suggests that drawings may measure more of what people know than the verbal counterpart in certain instances. Besides, students have fun doing visualization exercises! Why not use them more often?

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Tri-Coding Of Information

by Timothy J. Simpson

Abstract

Paivio's (1979, 1986) Dual Coding Theory has received widespread recognition for its connection between visual and aural channels of internal information processing. The use of only two channels, however, cannot satisfactorily explain the effects witnessed everyday. This paper presents a study suggesting the presence of a third, kinesthetic channel, currently used by NLP practitioners, which operates in cooperation with the channels of Paivio's theory and expands its usefulness.

Paivio (1979, 1986) presented a theoretical construct which he called dual coding to explain the manner in which people process and make sense out of the information with which they come into contact. According to this construct, dual coding comes about as a result both of the aural and visual nature of the way the human brain processes information. Sense of each modality is made from their own representational system within the mind and experience of the individual. Information bits accessed in the internal visual channel are called imagens, while information bits accessed in the internal aural channel are called logogens. They come into contact with each other within the consciousness of the individual, and they each alter the meaning assigned to the other in the process because of their associations from within a person's memory and experience.

During the 1980's and 1990's there have been several attempts made to validate Paivio's construct (*e.g.*, Dean & Gray, 1985; Kulhavy *et al*, 1993; Mayer & Sims, 1994; Kounios & Holcomb, 1994; Sadoski, Goetz & Avila, 1995). Each of these studies examined the connection between verbal and visual information presented to subjects. Each concluded that the concept of dual coding of information explained their results. In addition, Dean and Gray's (1985) conclusions were based upon the connection they perceived between the hemispheric nature of the human brain and the conceptualization from the dual coding hypothesis. Most also concerned abstract and concrete nature of stimuli, which Paivio (1986) also predicted.

In each case, these studies restricted themselves to the two internal processing channels which Paivio (1979) had hypothesized. From practical experience, however, Paivio's construct falls short. People aren't restricted to mentally processing information verbally or visually solely. There seems to be another influence present. The history of music has provided several examples of compositions which influence people profoundly even today. The feelings do not come merely from the sound but also from the feelings which listeners have for their associations with these sounds. In recent times, broadcast commercials have attempted to elicit emotional responses from their audiences to purchase products or services they might not otherwise purchase. Public service announcements seek to influence their audiences to change the *status quo*, to make decisions differently, to act in a manner consistent with their presentations rather than in the manner in which people might be expected to otherwise react. These examples suggest that there is another internal channel of information processing which also has an effect on altering the meaning of verbal and/or visual stimuli.

Paivio's construct came out of a tradition of research which required an emotional detachment of the researcher from the subject under study (*e.g.* Gay, 1996; Kerlinger, 1964). This detachment has a purpose: to prevent an emotional bias on the part of the researcher from unduly influencing the results of that research. While this is indeed a desirable goal, the way it has been met has itself biased the research conducted in information processing, as an impediment to an impartial consideration of Paivio's construct.

In an attempt to meet the goals of research methodology regarding reduction of bias while addressing the need for examination of an emotional influence, this project sought a different paradigm. This paradigm needed to accept the presence of emotions, feelings, and so on, from the subject while having a way of identifying the influence which these feelings would have over the results of the study, maintaining other methodological considerations. The technique chosen was one developed in 1975 using Neurolinguistic Programming (NLP).

NLP was developed by Bandler and Grinder (1975) from basic concepts in classical conditioning. According to the concept of NLP, a person facing a stimulus has a reaction which results from their past experience, their understanding, and their training. These associations control their actions and behaviors, at both the voluntary and involuntary levels. By examining the changes in involuntary reactions an individual presents, an investigator can draw conclusions as to how an individual is internally processing the information, how it is influencing that individual by sparking an internal change, and so on. NLP has had its greatest impact on the field of counseling, giving a counselor or therapist clues as to changes in internal state, crisis points in change patterns, and so on. Changes important in treatment of phobias and other therapeutic techniques owe much of their success to the information these techniques can give a trained professional.

The techniques of NLP have been used in counseling because it allows a trained counselor to access information about a client of which the client may be unconsciously aware and unable to verbally express. By examining changes in a person's breathing rate and pattern, skin color, eye movements, and so on, a counselor can determine unconscious feelings, attitudes, and so on, which would impact a person's performance (Charvet, 1993). Using NLP techniques in other fields has been suggested as well. Classroom learning (Simpson, 1994; Nagel *et al*, 1993), sales (Reese & Bagley, 1987), and personal development (Robbins, 1992) have most notably utilized these NLP techniques.

In this project, information on how subjects were processing information was drawn using the NLP calibration techniques of eye accessing, breathing, and skin color. These were correlated with the way the stimuli were presented, the subject's primary (or chosen) processing modality, gender of subject, level of education, and age (development).

Method

Subjects in first part were 25 people (14 male, 11 female) ranging in age from 16 to 53. All were high school graduates, with over half holding college degrees, three of these graduate degrees. All were volunteers from three social groups who participated individually at a time of their convenience during the early months of 1996. None was selected on the basis of any other characteristics.

In the second part, subjects were 11 people (4 male, 7 female) ranging in age from 5 to 16. All volunteers participated individually. They were enrolled in a summer program in Broward County Florida during the middle of 1996. All were public or private school students K-12. Each provided consent from one of their parents prior to participating in the study. None was selected on the basis of any other characteristics.

Each subject first participated in a screening interview. At this time, subjects were asked questions which prompted them to internally process data aurally, visually, or kinesthetically to establish their personal preference of internal information processing modality. (This is not controlled by the modality of the stimulus. Rather it is a preference as to how the brain internally processes information presented to it, regardless of the sensory modality used in information acquisition.) All subjects were then asked a series of six questions which prompted each of them to process information using each of the three identified modalities (aural, visual or kinesthetic). The eye accessing, breathing, and skin coloring processing cues they presented in response to these questions were recorded. From this information, each subject was identified by preferred internal information processing style.

At the conclusion of this interview, each subject was asked to (1) listen to a four minute audio recording of a transcribed radio drama, and (2) participate in a three minute dialogue with two confederates who were working from a script designed to actively involve the subject emotionally by challenging their feelings on the topics of politics and religion. Each confederate was also trained to make the observations needed for the analysis of involuntary cues from the subjects. These were keyed to a common NLP calibration checklist and then correlated with the cues used in the calibration interview (eye accessing, breathing, and skin coloring).

At the conclusion of each study, a focus group composed of several of the subjects in each study was separately conducted. This was done to determine if subjective comments from the participants could help explain the observations. The focus group was conducted within one week of the members of the focus group' participation in the study.

Results

Of the 25 subjects in study 1, all but 3 (1 male and 2 female) appeared to show a strong preference for visual processing of information. Of the 11 subjects in study 2, 3 (1 male and 2 female) showed a preference for visual processing of information, 2 (1 male and 1 female) showed a preference for aural processing of information, and the remaining 6 (2 males and 4 females) showed a preference for kinesthetic processing of information. When faced with the audio tape and the conversation, each subject in study 1 processed information in more than one modality, although there primary modality was used more than any other. In study 2, the subjects were, for the most part, unable to change from their preferred processing modality. Gender of subject was not a significant factor, but age and educational background seemed connected together as a single contributing factor.

Discussion

Differences in age between the subjects in study 1 and study 2 show an interesting difference. The adults in study 1 were almost all primarily visual processors, but they were adept at processing information in each modality to a degree when called upon to do so. This seems to suggest that adults have an acquired ability to process in each modality, but they tend to process information in a combination of internal modalities as circumstances dictate. The juveniles in study 2, however, had a much broader range of preferred modalities. They tended to rely almost entirely on their preferred modality, regardless of the modality suggested by the stimulus. This would indicate that developmental stage (age) plays a role in the options one has available. As one ages, experience in using different modalities seems to offer the adult a choice, although the adults tended to use the options in combination with their preferred modality rather than use modalities with equal facility.

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Gender of subject appeared to play no part in determining internal processing preference or the ability to change modality as dictated by need. Although there are differences in number of males and females in each study, because of the small number of subjects involved there is no reason to assume gender is a factor.

Education of subjects, while probably a confounding influence with age, suggested that the academic training received in more extensive years of schooling trained the internal information processing capabilities of the subject. Those with more than a high school education were more able to move among the modalities and showed less of a dependence on their preferred modality (they combined the two less often than those whose education was limited to high school). However, since most of these subjects also had graduate school experience as well, lacking a group with undergraduate education, there is little reason to believe this is a continuous development.

The best indication that comes from the results is support for the idea that people use three, not just two, modalities of internal information processing. This supports the contentions of NLP practitioners that we are creatures of our emotions and feelings as much as of our words and visual images when it comes to the internal processing of information. With experience and practice, we develop an ability to utilize more than one modality effectively. We develop a preferred modality, and when there is no specific reason for choosing one modality over another this would seem to be the one we use. Those lacking experience and training (children in this study) develop one internal processing modality, which they seem to use in all situations and contexts. When that modality is not appropriate, they do not have another modality available to which they can switch. Consequently, they are limited in their ability to easily and smoothly assimilate information in comparison to adults.

During the course of this study, two additional observations were made which were not planned. First, children tolerated outside noises better than adults. One possible reason for this would be that the concentration required of them to process information effectively cuts off the influence of external competing stimuli. Adults, on the other hand, being more able to make adjustments in their processing of information, do this without conscious effort (an idea which was supported by spontaneous comments from several of the adult subjects after their participation). Those making this suggestion also stated that the external noise disturbed their concentration, but didn't necessarily prevent them from processing the information. The children in study 2, however, seemed to block out the noise. Many were asked about this after their participation, and they suggested that they have little difficulty concentrating on processing information, when they do concentrate.

The children in study 2 also offered that they have difficulty concentrating in areas where there are few external distractions. Many stated that they preferred the noise of a television or radio while thinking. Two of them stated that they do not use the library at school because they are unable to think in the quiet environment associated with a library. Instead, they prefer to study and think in an atmosphere which seems to bother adults.

Second, and of more importance here, each subject who was able to explain how they prefer to process information also suggested that the presence of other modality of stimuli tend to confuse them and make the information more difficult to process. For example, one woman who preferred visual internal processing stated that she had great difficulty listening to the words in conversations, but that if she pictured the images those words elicited in her mind she was able to process and retain most of the information in the conversation. Another woman, with an aural preference, said she had difficulty processing the words in a book unless she read the book internally to herself. Then she was able to process the information easily and retain it for later use.

Conjecture

With the suggestion by Dean & Gray (1985) that the hemispheric nature of the brain mirrors the concept of modalities presented in NLP, an interesting conclusion can be drawn. If NLP accurately describes the way we internally process information, then we do indeed make use of more than the two channels Paivio (1979, 1986) suggests. We use this capability without conscious control. While Paivio's hypothesis certainly seems accurate, it would seem the addition of another channel would be in order. A kinesthetic channel would explain how emotions and feelings attach to words and how each of us derives a unique personal meaning from events experienced in common with others.

This seems to hold true particularly in visual terms. The focus group of adults consistently commented on the importance of visual images to their ability to accurately and efficiently process information. If these visual images were lacking, the information tended to be jumbled and disjointed. If images could be associated later, many times the information could be retrieved and processed effectively.

The content of the visual images they created was also important. Strong emotional associations were common, which would explain the ability of propagandists to evoke emotions from people with visual images. Paivio's hypothesis, with the addition of a third (kinesthetic) channel, can effectively and efficiently explain this phenomenon. Its existence has been shown too many times throughout history, and the theme has been used extensively in literature (*e.g.*, Aldous Huxley's 1984). The alterations of meaning associated with visual images (imagens) and aural internal stimuli (logogens) and kinesthetic stimuli needs examination. Paivio has given us the concept to use. With a simple addition, we can begin to discover the mechanism by which we develop meaning from visual images.

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Table 1.
Information Processing Modalities Used by Subjects in Study 1

Modality	Radio Program	Conversation
Visual (Male)	14	12
Visual (Female)	11	9
Aural (Male)	10	11
Aural (Female)	10	9
Kinesthetic (Male)	11	9
Kinesthetic (Female)	11	11

n (males) = 14, n(females) = 11
Table shows modalities used during condition, not preferred modality.

Table 2.
Information Processing Modalities Used by Subjects in Study 2

Modality	Radio Program	Conversation
Visual (Male)	2	3
Visual (Female)	5	5
Aural (Male)	2	2
Aural (Female)	6	7
Kinesthetic (Male)	2	4
Kinesthetic (Female)	7	7

n (males) = 4, n(females) = 7
Table shows modalities used during condition, not preferred modality.

Table 3.
Percentage of Time Modalities Used by Subjects in Study 1

Modality	Radio Program	Conversation
Visual (Male)	42%	36%
Visual (Female)	36%	33%
Aural (Male)	37%	40%
Aural (Female)	37%	36%
Kinesthetic (Male)	21%	24%
Kinesthetic (Female)	27%	31%

n(males) = 14, n(females) = 11
Table shows percentage of modality use during condition, not preferred modality.

Table 4.
Percentage of Time Modality Used by Subjects in Study 2

Modality	Radio Program	Conversation
Visual (Male)	55%	59%
Visual (Female)	29%	24%
Aural (Male)	20%	25%
Aural (Female)	56%	59%
Kinesthetic (Male)	25%	16%
Kinesthetic (Female)	15%	17%

n(males) = 4, n(females) = 11
Table shows percentage of modality use during condition, not preferred modality.

Table 5.
Other Modality Use Related to Preferred Modality, Study 1

	Visual	Aural	Kinesthetic
Visual (m)		11	12
Visual (f)		9	9
Aural (m)	0		0
Aural(f)	1		1
Kinesthetic(m)	1	0	
Kinesthetic(f)	1	0	

n(males) = 14, n(females) = 11
n(Visual - m = 13, f = 9), n(Aural - m = 0, f = 1), n(Kinesthetic - m = 1, f = 1)
Table indicates number of subjects using each non-preferred modality per preferred modality.

Table 6.
Other Modality Use Related to Preferred Modality, Study 2

	Visual	Aural	Kinesthetic
Visual (m)		0	0
Visual (f)		2	1
Aural (m)	1		0
Aural(f)	1		1
Kinesthetic(m)		1	0
Kinesthetic(f)		2	1

n(males) = 4, n(females) = 7
n(Visual - m = 1, f = 2), n(Aural - m = 1, f = 1), n(Kinesthetic - m = 2, f = 4)
Table indicates number of subjects using each non-preferred modality per preferred modality.

Diversity In Cyborg Images: A Case Study Of Barry Levinson's *Toys*

by Linda E. Lucek

Abstract

The image of the cyborg is proliferating. Associated with the cultural paradigm of postmodernism, the cyborg, in its numerous aspects, has become a predominant metaphor used to describe the relationship between humanity and technology in post-industrial information societies. This case study of Barry Levinson's 1992 comedy film, *Toys*, is meant to demonstrate some of the many faces of the cyborg.

Introduction

There are various postmodern genres about cyborgs and cyborgization. I will be using the term Cy-Fi here to designate all forms of cyborg fiction.

The overlapping and mutual influence of science fiction and other postmodern fictions has often been noted. Jeff Cupp and Charles Avinger (1993) state:

> Science fiction and fantasy may be considered ephemeral, extra-canonical, or even, heaven forbid, popular genres; however, they offer exactly what many postmodern writers have been looking for--an escape from a reality principle which has come to be perceived as immovable, and an alternative vision of a world which seems to be moving toward its own desolation.

They point out that postmodern writers such as Pynchon, Vonnegut, Marge Piercy, and Stanley Elkin, Garcia Marquex, Calvino, and William S. Burroughs have all written works which could be classified as science fiction or fantasy.

Cultural identity has been defined within the cyberpunk fiction genre as the blackly humorous condition of never fully owning oneself, as exemplified by hybrid, cyborg identities. The technoculture of the cyborg has radically permeated a segment of youth culture which has adopted the name of the science fiction genre it tries to emulate. There is a great deal of evidence showing an increasing influence of cyberpunk and science fiction in general on diverse cultural discourses.

Increasingly, we are being bombarded with cyborg images from literature, film, television, and the discourses of social reality. But how is it that cyborgs can be conceptualized as both killing machines and creative artists? There is new interest in addressing this diversity in cyborg imagery among critics of film and literature.

Scott Bukatman's 1993 book, *Terminal Identity: The Virtual Subject in Postmodern Science Fiction*, emphasizes how Cy-Fi begins to address the connection between new forms of control and freedom brought into being by a high-tech, postmodern culture and the advances of feminism, minority discourse and ecological inquiries. Nor is he alone. Jenny Wolmark similarly addresses Cy-Fi as social discourse in her book, *Aliens and others: Science fiction, feminism, and postmodernism* (1994), distinguishing between the cyberpunks of the male-dominated genre and cyborgs from feminist science fiction.

> Cyberpunk explores the interface between human and machine in order to focus on the general question of what it means to be human; feminist science fiction has also explored that interface, but in order to challenge those universal and essentialist metaphors about "humanity" which avoid confronting existing and unequal power relations. Cyberpunks and cyborgs can therefore be regarded as related responses to technology that are rooted in gender, and in different ways both seem to

asked question is "what are the various cyborg discourses being presented here?"

The theme that runs throughout the film and the one thing that all the Zevos appear to share in common is their love of gadgetry, of *toys*. What differs between the military Zevos and the civilian Zevos are their conceptions of what makes a good toy, and what a toy should be good for. (At one point, when one of the General's disguised war toys starts shooting ammunition from a baby bottle, Alsatia says "That's a very *bad* baby!")

It is their mutual love of technology that makes them all exceptional candidates for cyborgization. But I hope it will become apparent, that I do not use the term "cyborg" or employ that concept in a disparaging way. Rather, my point is that cyborgization can come in many flavors, not solely the typical terminator. I will briefly recount some of the cyborgization indicators present in the film's characters.

Kenneth

Kenneth Zevo has only a minor technological implant -- his pacemaker, which is connected to his beanie propeller as an early warning system. It was much more than cosmetic, however, considering its life-extending functionality. His affinity for technology took the form of whimsical gadgets.

Figure 1
TOYMAKER KENNY

Leslie

Leslie, the film's hero, continually appears manipulating or wearing various gadgets throughout. Novelty apparel is one of his specialties. At one early point in the film, he strides through the toy factory, with great billows of smoke streaming behind him. He's wearing a "smoking jacket" that makes him look like a walking smoke bomb or powerful wizard. In this fashion, he *appears* to be a commanding cyborg presence. Later, we see him wearing a body-sound jacket, wired to make different wild sounds depending on how he moves. It is merely a guise, however, a cosmetic technology that he can put on or take off. His power is nothing *but* smoke, for while incorporating his father's whimsical ideals, Leslie has never been forced into the harsh realities of leadership, power struggles, and responsibility and thus, at the film's outset, he remains a boy with his toys.

Figure 2
LESLIE SMOKES

The General (Leland)

The General is another boy with toys, but molded in his own father's image. He takes everything (himself included) *too* seriously, except (in that paradoxical twist) humanity. The outcomes of war have been separated from his consciousness like the severing of the corpus callosum, so that his right side does not truly understand what his left is about. He is excited by the prospects of training and using children as war machines. "Let the games begin" he says just before the final showdown. He watches the battle simulation on his security system with glee as scores are tallied in video game fashion, but the scores represent the actual stalking and destruction of his own relatives by his mechanical creations. He is a military cyborg, as is his son, Patrick.

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Patrick

Patrick also has a propensity for extending his functionality through technology--espionage bugs, x-ray cameras, the security "nerve center." *The Terminator*'s cyborg, the T-800 (played by Arnold Schwarzenegger) has a metallic endoskeleton covered with flesh, while these military cyborgs have symbolically hard *exteriors*. Alsatia tells her cousin Patrick that he reminds her of Leslie. When Patrick protests that they are the exact opposite, she responds "Exactly", because Leslie is all silly and soft on the outside but strong on the inside while Patrick is the exact opposite. Patrick has a penchant for novelty apparel similar to his cousin's but, being a military cyborg, it manifests as camouflage costumes.

Figure 3
PATRICK IN CAMOUFLAGE

Old General

Like his son, the old invalid General's eyes light up when he anticipates the excitement of the impending toy war.

Happy Workers

This film's soundtrack is exceptional. One song, entitled *Happy Workers*, is choreographed with visual images of the toy factory assembly line workers doing their jobs in energetic style. They are integrated in a positive way with the company's technology, "joyous in [their] industry". While factory work is often held up as dehumanizing, it is being portrayed here as satisfying in a supportive corporate culture. The "happy workers" soon become disgruntled and start leaving once the military faction begins to take over.

Figure 4
HAPPY WORKERS
ASSEMBLY LINE

Security Workers

The General's new security personnel are just following orders, like programmed machines. They march through the factory in formation to a military beat. Suddenly photographic identification is required of everyone in the company. A culture of fear and intimidation is generated. Barbed wire and monitoring devices start to pop up.

Child Workers

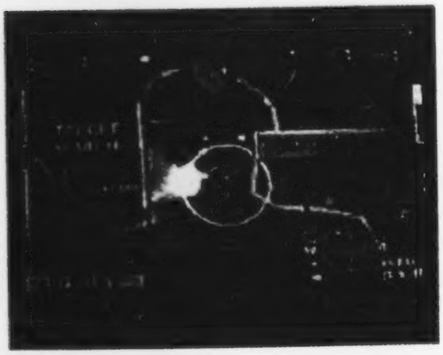
In the restricted area, Leslie finds the children who are testing the General's video wargames. They barely notice him, being mesmerized by their games and concentrating on accumulating their points by blowing up military bases, people, army tanks, and helicopters. A thousand points are scored for blowing up people.

The General has hopes of starting daycare centers (a philanthropic gesture) in poverty areas, where welfare mothers can leave their children all day long and they can be taught to read and write using video computer programs. In addition, he plans to create a special variety of programs to develop hand-eye coordination, train children in the use of sophisticated equipment, simulated flight experiments, and visual laser lock-on. The culmination of the children's daycare training would be "flying" an actual combat mission using remote-control weaponry while the kids still think they're playing a game.

Sea Swine

The "classic" cyborg formulation, the *thorough* blending of technology and organism is to be found in this film in the experimental amphibious sea swine, another military cyborg that appears vaguely similar to a hippopotamus equipped with robotic optical scanner, automatic weapons, and backup system. Leslie "discovers" it in the General's restricted area, when he breaks in, falls into its pit, and it attacks him. The lock-on laser targeting of the Sea Swine looks amazingly similar to that of the T-800 cyborg in *The Terminator* film. In true classic fashion, this technology later malfunctions, turning on its creator (the General).

Figure 5
SEA SWINE'S LOCK-ON LASER TARGETING THE GENERAL



Alsatia

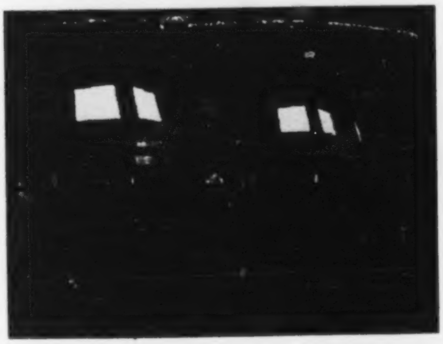
Alsatia becomes an obvious possibility for cyborg candidacy, once it becomes apparent that she is an AI (artificial intelligence). It might be argued that she is a *robot* rather than a cyborg. However, it seems inconsequential whether her flesh is more or less *artificial* than that of *The Terminator's* T-800 when considering the dominant function she was meant to perform. She was designed by her father to be a human sister to Leslie and she fulfills that role quite successfully.

Although she has helped to test some of her brother's high-technology creations, such as a virtual reality system they call the "Woozy Helmet", Alsatia's own work at Zevo Toys is less technology oriented. She also wears novelty apparel, but it is limited to trying out all the paper doll fashions on herself. She is an *Amish* cyborg, sticking simply with the basics. She calls her dolls and doll fashions "endearing" and employs creativity and artistry in her work.

Alsatia's military-minded cousin, Patrick, doesn't realize that she was engineered until the sea swine blows her head off. Then he comments "Alsatia's a *robot?* ... I always thought she seemed the same age." An immediate mental disparity is generated when he calls her a *robot*. It stems from the juxtaposition of the image of Alsatia in her paper doll "office" with the image of the numerous military robots being manufactured in the General's restricted area. (Compare Figure 6 below with Figure 7 which follows.)

Figure 6
ALSATIA IN DOLL CLOTHES

Figure 7
THE GENERAL'S ROBOTS



With springs hanging out, Alsatia's disembodied head asks Leslie "Do you--do

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you *love* me?", next proclaiming (in Tin Woodsman fashion) "I miss my heart." Unlike the General, she had a heart all along. What she and Leslie both lacked initially was the grown-up courage (in Cowardly Lion fashion) to fight with the General to uphold their principles.

Toys

The original factory toys and new military toys are intimately involved in the cyborg narratives of the film. Some, such as the Woozy Helmet are worn by the characters and integrate technology with their senses.

Figure 8
SHARED VIRTUAL REALITY USING THE WOOZY HELMET

Although the toys are not sentient, they are often anthropomorphized--especially when the toys become the army in the final battle scene. Little wind-up bears seem to care about each other when shot, little penguins appear agitated when knocked down by a military jeep, a wind-up child and dog appear to escape into the night.

The Closing of the Year

While the film depicts a hero's journey for Leslie, at the same time it is presenting a hopeful metaphor for the rest of us. The film begins and ends during the joyous company Christmas celebration. It is a whimsical yet sacred time, a time of hierophanies, cyclically surrounding a transitional, liminal year.

The song that both opens and closes the film is *The Closing of the Year*. The central message of the film is presented in its first line which is "If I cannot bring you comfort, then at least I bring you hope...." We are not to be made comfortable or less vigilant in our struggle, but at least we should know there is hope.

The International Children's Choir doing the singing (along with Wendy Melvoin) is positioned in a Christmas tree formation. At the closing celebration, we think we hear the dreaded sea swine again, only to be shown that it is only the innocent play of the wind-up alligator making similar sounds and then we see that the victorious, wholesome toys appear where the children had previously in the tree.

The cherished airplane that carries Santa Claus into the spectacular mock-up of downtown Manhattan during the celebration is a sharp contrast to the film's many remote-control combat planes involved in destructive pursuits.

Summary

Shown below in Figure 9 is a summary table of the cyborg indicators which I found in the characters of this comedy film.

Figure 9
CYBORG CHARACTERIZATIONS IN *TOYS*

Character	Cyborg Indicators
Kenneth	implanted pacemaker connected to beanie propeller
Leslie	love of whimsical toys; novelty apparel
General	love of war toys
Patrick	camouflage apparel, mechanisms of espionage
Old General	eyes alight at the prospect of war
Happy Workers	well-integrated into factory mission
Security Workers	unquestioning military compliance with orders
Child Workers	innocently/naively interfaced with war videogames
Sea Swine	"classic" cyborg; made of flesh and bolts; turns on its creator
Alsatia	"robot" sister
Toys	majority on both "sides" were anthropomorphized

I hope that I have demonstrated through this exercise that cyborg characteristics are not in and of themselves good or bad. Rather, they are a consequence of the postmodern world we currently live in.

Cyborg images can take as many possible forms as we have possible futures and it is always up to us to maintain vigilance in guiding their development.

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Linking Reading And Writing: Concept Mapping As An Organizing Tactic

Rionda Osman-Jouchoux

Abstract

A pilot study of an instructional unit on summarizing technical texts suggests that reading strategies and concept maps can be used effectively by undergraduate technical writing students. The strategies chosen were simple heuristics based on theoretical descriptions of the processes successful readers and writers use. Concept maps provided a transition between the two sets of strategies, allowing learners to organize their understanding of the text.

When writers successfully summarize texts, they must first read and understand new information and, then, transform that information to fulfill a specific purpose. Concept mapping, used as a visual organizing technique, can be an effective link between the two processes.

In a preliminary study, students in an undergraduate technical writing class were given a three-part, paper-based module on summarizing texts. Each part presented instruction on metacognitive reading strategy, summarizing strategy, and concept mapping. Students read and mapped three texts and wrote summaries of two of the texts. As part of the reading strategy, students completed concept maps of the text before writing summaries. As part of the mapping tactic, students were instructed to label the links between ideas. Those students who completed the maps with labeled links generally wrote summaries that effectively transformed information.

This paper describes the development of the pilot module, including the reading strategies and the cognitive processes involved in writing summaries. Then, the linking function of cognitive maps is discussed. Finally, the conclusions and speculations this study provided and the implications for further study are discussed.

Summarizing — The Problem

Over several semesters students in an undergraduate technical writing class have had difficulty producing summaries of texts. Many of their summaries consisted of truncated sections of the original text; many ignored important ideas and emphasized relatively obscure points. It appeared that many of these students did not understand the material they read and, so, were unable to transform the ideas into coherent, concise renditions of the text.

The instructional unit developed to address this problem presents the task of summarizing technical texts in two steps. First, learners are instructed to read the text purposefully and, then, to write a summary of the text guided by prompts. To connect the two sets of strategies, learners were asked to construct concept maps of the text as a way to organize the knowledge gained from reading the text and to gain an overview of the information to be summarized.

This unit was designed to present simple, almost intuitive strategies that encourage learners to consider their tasks and to monitor their understanding. These goals were formulated from the research literature. From that literature we know that learning strategies can enhance learning (see, for example, Dansereau, 1985). We also know that often learners do not use learning strategies even though we think they should.

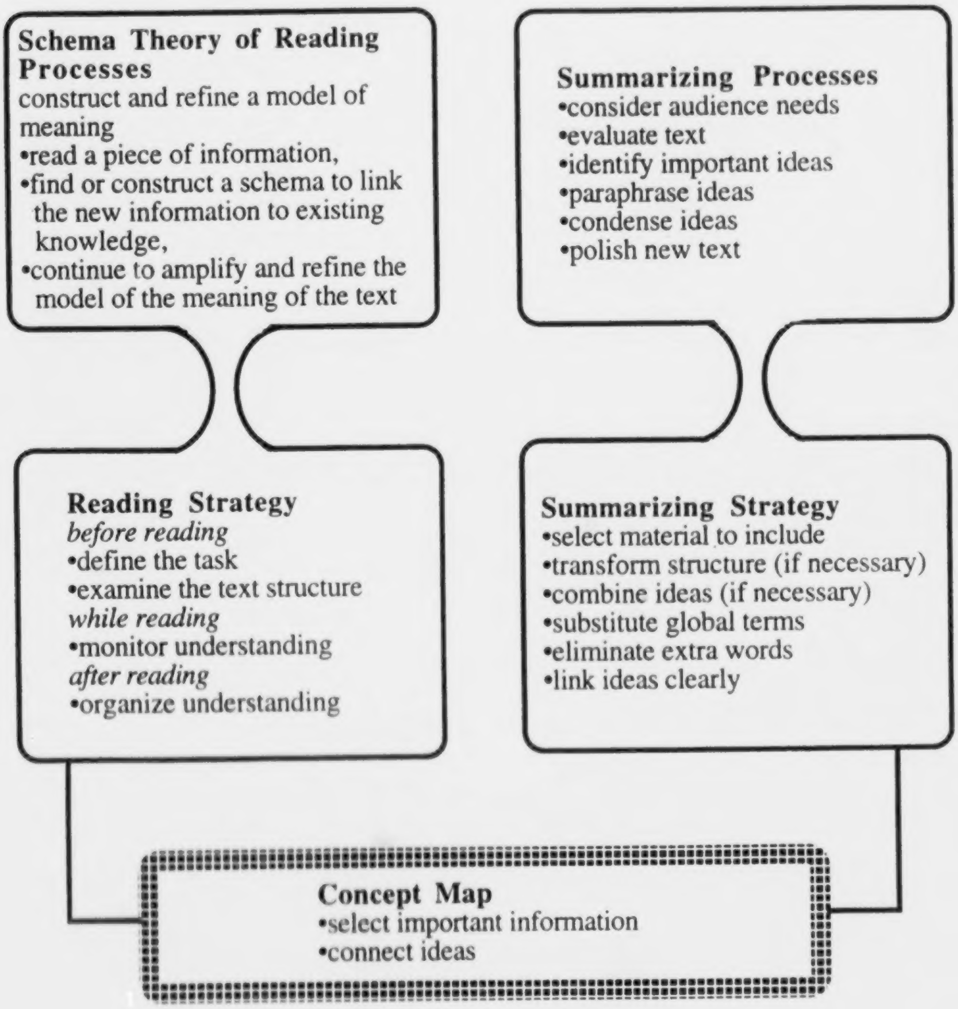
Garner (1990) has addressed the problem of failure to use learning strategies, and her reasons that learners do not use strategies include:

- often learners do not monitor their learning, either because they do not understand how to evaluate what they are doing or too many demands are made on memory resources.

- learners often have work habits that are successful in some situations, and they are reluctant to abandon routines.
- learners may lack the in-depth knowledge base that would enable them to use higher reasoning when they encounter new information.
- learners often experience instructional situations that discourage trying out strategies.
- often learners acquire a strategy in a specific set of circumstances and are then unable to transfer that skill to other circumstances.

The strategies developed for the summarizing unit consist of simple heuristics designed to guide the learner through the processes good readers and writers are presumed to use. See Figure 1.

Figure 1
Reading and summarizing processes and strategies linked by concept maps


Schema Theory of Reading Processes
construct and refine a model of meaning
•read a piece of information,
•find or construct a schema to link the new information to existing knowledge,
•continue to amplify and refine the model of the meaning of the text
Summarizing Processes
•consider audience needs
•evaluate text
•identify important ideas
•paraphrase ideas
•condense ideas
•polish new text
Reading Strategy
before reading
•define the task
•examine the text structure
while reading
•monitor understanding
after reading
•organize understanding
Summarizing Strategy
•select material to include
•transform structure (if necessary)
•combine ideas (if necessary)
•substitute global terms
•eliminate extra words
•link ideas clearly
Concept Map
•select important information
•connect ideas

Garner's (1990) concerns were taken into consideration in developing these strategies. Readers are prompted to define their task, to examine the text's structure, and to set goals for themselves. Readers are prompted to be aware of portions they do not understand. The unit provides encouragement to break habits, and the extremely general nature of the prompts should not discourage transfer to other circumstances.

Reading Strategy

Schema theory provides us with a description of the process of meaning-making. A reader reads new information and activates an existing mental schema, or creates a new one, that allows the reader to connect new information to the already known. Then, as pieces of information are added, a mental model that represents the meaning of the text is constructed and refined. Reading, then, is a process of acquiring information and relating new to known knowledge.

From this description of reading, we can recognize the processes good readers use: they examine the structure of the text, they set goals for their reading and their learning, they check on their understanding as they go along, and they evaluate their understanding. (For one account of the processes of good and weaker readers, see Pearson and Raphael, 1990.)

The reading strategy presented in the summarizing unit calls upon readers:

before reading
  to define their task
    — why am I reading this? what do I need to get from this text?

while reading
  to monitor their understanding
    — do I understand this passage? why not? do I need more information?

after reading
  to organize their understanding
    — do I understand this material? how do the parts relate to each other? does this new information fit with what I already know?

Figure 2 reproduces a page of the summarizing unit. The text is presented on the right, and the reading strategy cues are on the left.

Summarizing Strategy

Summaries and the abilities needed to produce them have been of interest to several research teams (Brown, Campione, & Day, 1981; Brown & Day, 1983; Brown, Day, & Jones, 1983; Winograd, 1983) who have found that, developmentally, summarizing is a late-developing skill useful in investigating higher-order comprehension problems of good and poor readers.

However, Hidi and Anderson (1986) pointed out that writing a summary of an existing text is fundamentally different from other writing tasks. When producing original text, we plan content and structure and generate ideas and details in a pattern of activity that continually shifts among these tasks. When writing summaries, we must comprehend and evaluate existing texts and condense and transform the ideas we find there.

Writers of effective summaries:

select material to include
  — is this trivial information? redundant information?

select or write topic sentences
  — should I maintain the original structure? can I combine these ideas? is this structure accurate with respect to the original?

paraphrase and polish
  — can I substitute a global term for a list? can I eliminate extra words? are these ideas clearly linked?

We can view the processes used in reading technical material and writing summaries through the early theoretical work on self-regulated learning of Corno and Mandinach (1983). They provide a framework that describes necessary-activities when learners are learning most effectively. Specifically, when learners are comprehensively engaged, they acquire knowledge by the processes of attending,

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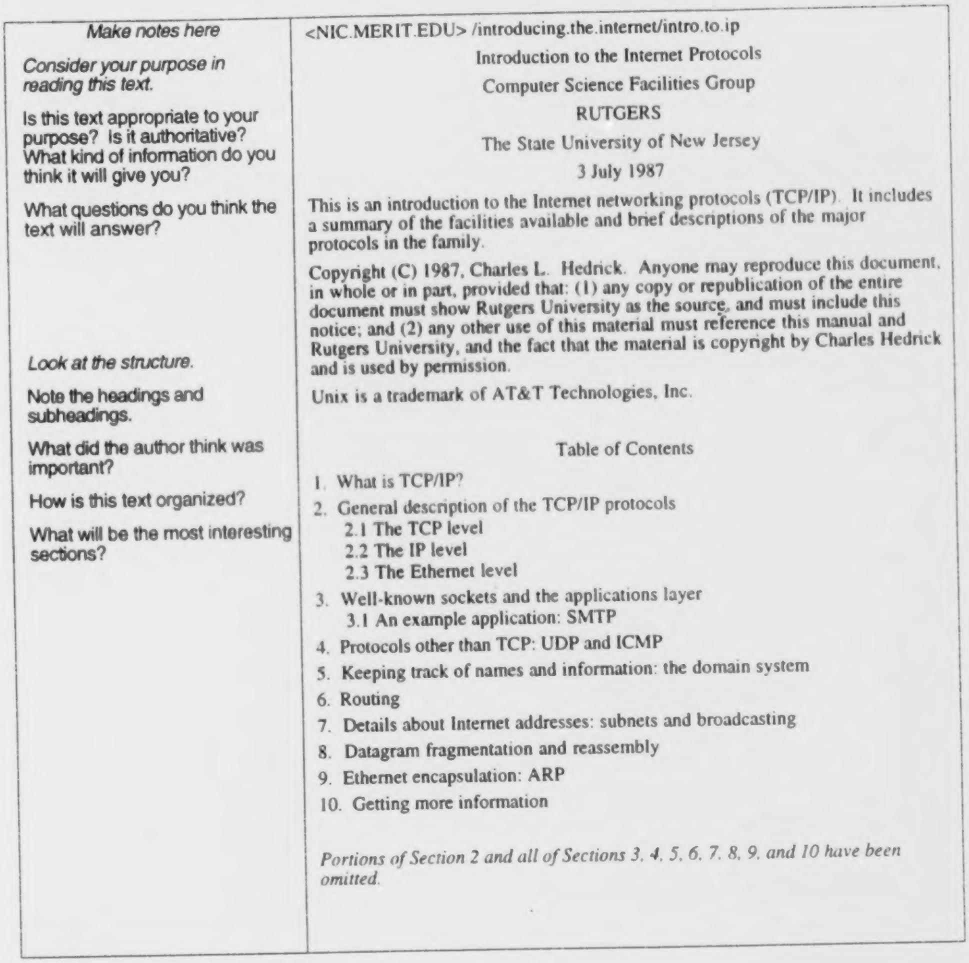
Figure 2
A page from the summarizing unit, Part 3



Make notes here

Consider your purpose in reading this text.

Is this text appropriate to your purpose? Is it authoritative? What kind of information do you think it will give you?

What questions do you think the text will answer?

Look at the structure.

Note the headings and subheadings.

What did the author think was important?

How is this text organized?

What will be the most interesting sections?

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Introduction to the Internet Protocols
Computer Science Facilities Group
RUTGERS
The State University of New Jersey
3 July 1987

This is an introduction to the Internet networking protocols (TCP/IP). It includes a summary of the facilities available and brief descriptions of the major protocols in the family.

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Table of Contents

1. What is TCP/IP?
2. General description of the TCP/IP protocols
    2.1 The TCP level
    2.2 The IP level
    2.3 The Ethernet level
3. Well-known sockets and the applications layer
    3.1 An example application: SMTP
4. Protocols other than TCP: UDP and ICMP
5. Keeping track of names and information: the domain system
6. Routing
7. Details about Internet addresses: subnets and broadcasting
8. Datagram fragmentation and reassembly
9. Ethernet encapsulation: ARP
10. Getting more information

Portions of Section 2 and all of Sections 3, 4, 5, 6, 7, 8, 9, and 10 have been omitted.

rehearsing, monitoring, strategic planning. They then transform that knowledge by the processes of selecting, connecting, and tactical planning.

Concept Mapping

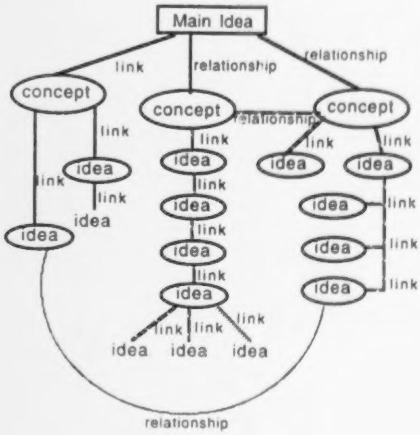
Transforming information is a process common to both making concept maps and writing summaries. Concept maps provide a flexible format for graphic representation of concepts and the relationships among them (Jonassen, Beissner, & Yacci, 1993; Novak & Gowin, 1984).

Visual organizers, in general, can be defined as graphic representations of different kinds of thinking processes (Clarke, 1991). Concept maps are a form of visual organizer that, as Clarke has pointed out, supports both inductive and deductive thinking.

In reading strategies, maps allow readers to organize their understanding of the text, including that obtained from the macrostructures of texts. When used in prewriting strategies, concept maps allow learners to organize their knowledge and develop their writing for an audience. By explicitly organizing their understanding of a text, writers of summaries should be positioned to transform information to the needs of a particular audience instead of using the most common strategy of presenting a sequential, abridged recapitulation of the text.

In the summarizing unit, learners were instructed to write the main idea of the text at the top of a sheet of paper. Then they wrote secondary ideas or subconcept below the main idea. Each subconcept was to be linked to the main idea and the link labeled to explain the relationship between the concepts. Each subconcept was to be described as completely as possible, and the links clearly defined. See Figure 3.

Figure 3
Generic example of a concept map



The Summarizing Unit — The Pilot

The goals for the pilot study were to determine:

- whether this approach allowed sufficient opportunity for students to become proficient with the strategies
- whether this approach took up too much time
- whether a metacognitive approach to reading as well as writing would address the summarizing difficulties of students
- whether the mapping tactic provided an opportunity for students to consolidate their learning or distracted from the task

The unit was used by students enrolled in an upper division technical writing class during Spring semester 1996. The three-part unit was used during class time. Part One required students to read a short text on learning style preferences, make a map of the text, and complete a learning style inventory. Part Two required students to read a short text defining the Internet, make a map of the text, and write a 200-word summary for a group of employees of a database company. Both Parts One and Two were completed in class. Part Three required students to read a much longer, more complex text describing TCP/IP protocols, make a map of the text, and write a 200-word summary for the same audience. Students received participation points for the first two parts, and the summary produced in the third part was graded. Figure 4 displays a map of a text, and Figure 5 displays annotated samples of summaries.

Fifteen students completed all three maps and both summaries. The unit contains written instructions for producing a map, and the class completed a map on the board after the first unit.

Both summaries received comments on the degree to which they were logically organized, addressed audience awareness issues, and were polished. Organizational problems and audience awareness issues occurred rarely. The polish of these summaries elicited the most comments.

These categories for comments reflect issues that writers must address; however, they do not tell us about the processes of summarization. When writers present information in the original sequence, often that form of organization is appropriate for a summary. In short pieces, audience awareness issues can be obscured. While learners are expected to polish their writing, in this case the first summaries (Part 2) were written in class; the second summaries

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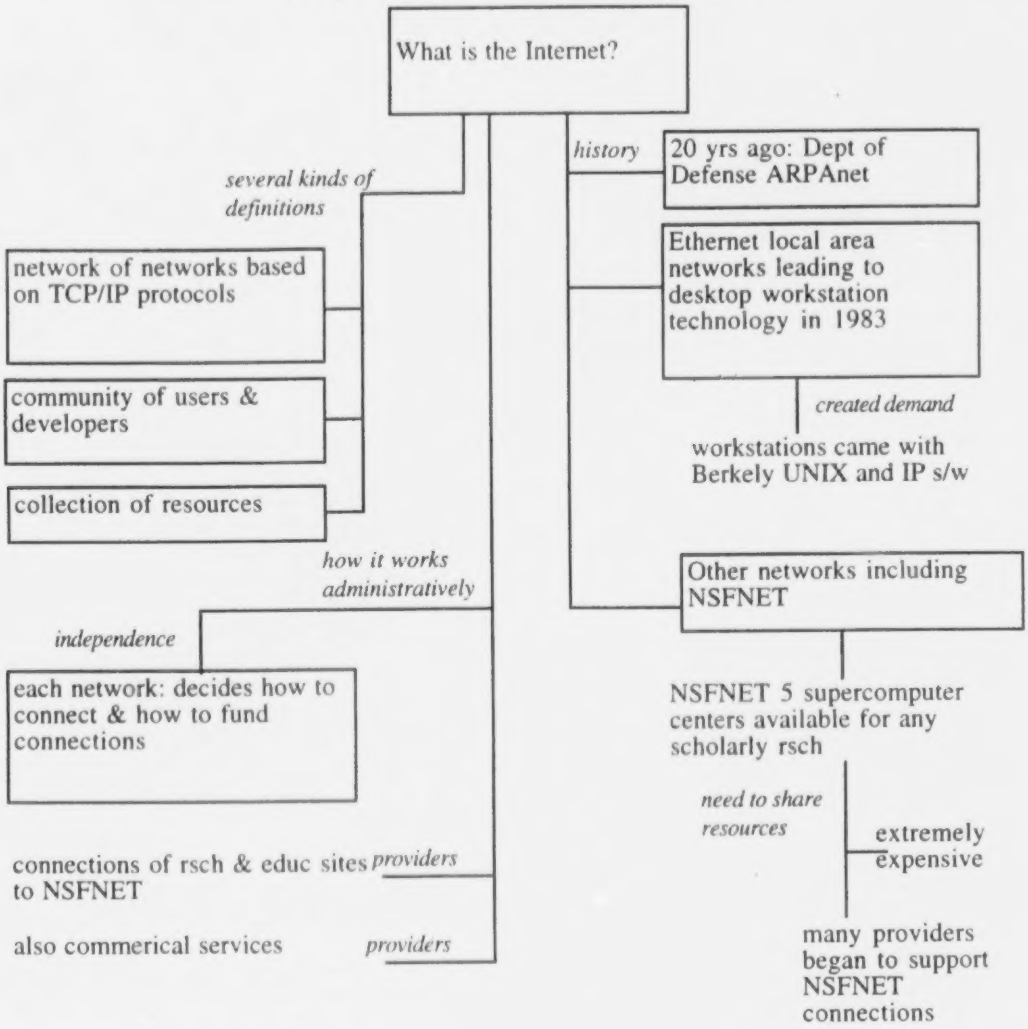
Figure 4
Concept Map of Text to Summarize (Part 2)


What is the Internet?
several kinds of definitions
network of networks based on TCP/IP protocols
community of users & developers
collection of resources
how it works administratively
independence
each network: decides how to connect & how to fund connections
connections of rsch & educ sites to NSFNET
providers
also commerical services
providers
history
20 yrs ago: Dept of Defense ARPAnet
Ethernet local area networks leading to desktop workstation technology in 1983
created demand
workstations came with Berkely UNIX and IP s/w
Other networks including NSFNET
NSFNET 5 supercomputer centers available for any scholarly rsch
need to share resources
extremely expensive
many providers began to support NSFNET connections

(Part 3) were take-home assignments, and the quality of transitions, usage, and flow was improved.

Conclusions and Speculations

The three-part unit did function succesfully as an instructional tool. It seemed to provide enough repetitions of the strategy instruction to allow students to use it well in the third part.

Used as an in-class exercise, however, the unit took a significant amount of class time. To be more acceptable to other instructors, the unit should be modified to be take-home exercises augmented by in-class discussions and explanations.

The technical writing students who completed all three parts of the unit produced summaries of the texts that were well-organized and that transformed the original

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Figure 5
Examples of Summaries from Part 3

	Comments
In laymen's terms, TCP/IP is a set of protocols that allow computers to share resources across a network. There are various vendors that support TCP/IP services.	combination of ideas across several paragraphs.
The more traditional services that TCP/IP offer are file transfer, remote log in, and computer mail. These services provide users to get and send files, log in from a different computer, and send messages to other computers.	polish issue: proofreading condensation of several paragraphs
More of the modern services are TCP/IP are remote print, remote execution, name server, terminal servers, and network-oriented windows system. These services allow a user to print from a remote printer, run a program on a different computer, file user names and passwords, allows small computers to run protocols, and programs to display on different computers. Both traditional and modern services are applied to all of the computers on the network.	polish issue: proofreading condensation of several paragraphs organizational issue: Should last sentence be the topic of the next paragraph?
These protocols are able to work by commands that have a logical progression. Each protocols runs off of the other. For example, the main commands feeds off of another set of commands.	polish issue: proofreading unclear paraphrasing of the protocols' interdependence
If more information is desired you can consult RFC, or Request for Comment. This will give you the answer you are looking for.	polish issue: punctuation audience awareness issue: will readers have access to the RFC?

	Comments
Computers, like people, have many different languages. When people want to communicate effectively, they must first agree on which language to speak. Computer networks operate the same way. For computers to communicate effectively, they need to follow a defined set of commands, or "protocols", that each system can understand. Once computers are able to "talk", they can share resources and perform certain tasks. Two of the most commonly used protocols are TCP and IP. Since these two protocols are often used in conjunction with one another, they are sometimes referred to, concurrently, as TCP/IP or IP/TCP. Some of the tasks they help perform are:	audience awareness issue: opening provides a simile that demystifies the technology
•file transfer - allows you to send files to or get files from another computer. •remote login - allows a user to login on any computer on the network. •sending mail - allows you to send mail messages to other users on the network.	organizational issue: only traditional services are listed, no recent developments are included
In short, TCP/IP allows you to expand your resources and working environment beyond your individual PC. With the help of these protocols you can access more powerful programs and expedite information more rapidly.	

material by combining ideas across sentences and paragraphs. Several were reluctant to label relationships among the ideas in their maps, and the first efforts of these students tended to present more information verbatim, with less effort to make transitions between ideas.

These differences in the summaries may be explained by the amount of effort that the writers put into their maps. As Corno and Mandinach's (1983) theory of self-regulated learning suggests, learners adapt the level of effort and the ways in which they acquire (attending, rehearsing, monitoring, strategic planning) and transform (selecting, connecting, tactical planning) information to the situation.

In the most involved mode of learning, comprehensive engagement, learners use all the learning processes and skills optimally. When learners are focused on a task, they emphasize transformation processes of selecting important information, connecting new information to already known, and making tactical plans to achieve the task. When learners are presented with situations that either encourage or force them to manage their resources, they expend effort in finding ways to avoid all or part of the effort (such as working with others to share work). When learners are in a passive position, such as a lecture situation, they receive information and avoid transforming processes.

Possibly, the summarizing process calls upon learners, first, to be comprehensively engaged to read the text and understand it thoroughly. They must, then, be focused on the task of producing the summary.

A follow-on study is being conducted that will try to examine the relationship between student effort and the quality of summaries. This study will investigate the following questions:

1 Do learners who use concept maps as metacognitive organizing strategies produce summaries of technical material that reflect transforming processes?

2 Does the level of learner engagement in construction of the concept maps affect the transforming processes found in their summaries?

In the proposed study, the mode of construction of the concept maps will be varied according to the type of learner effort required: entirely learner-constructed or pre-constructed. Examination of performance differences should reveal whether the writers are selecting important information, discarding irrelevant information, and making connections between ideas.

Summaries in the follow-on study will be examined for transformations in much the same way Winograd (1983) rated summaries of good and poor writers. Transformations, derived from those used by Winograd (1983) and Brown and Day (1983), include:

- paraphrases of ideas rather than verbatim copies of portions of text
- combinations of ideas across paragraphs
- substitutions of global terms for lists of items

We can speculate that readers who thoroughly understand the text they are summarizing would be more likely to produce paraphrases, combine ideas, and substitute global terms. We can also speculate that those writers who expend the effort to select important ideas and to make explicit the connections among the ideas, as they do when constructing a concept map, would more thoroughly understand the text. If that is the case, concept mapping would be an effective organizing tactic in metacognitive learning strategies.

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The Meaning Of Color In Trademarks

by Ed Johnson

Abstract

Accurately denoting colors and measuring their meanings have been long-standing challenges for scholars and artists alike. This study addresses this problem by suggesting the use of a model of cyan, magenta, and yellow primary colors, which is common in industry, but generally neglected by scholars and fine artists.

For this study, over 500 fictitious trademarks were uniquely colored by using this commercial model. Respondents evaluated these trademarks in terms of 57 scales. The results found five predominant factors (or meanings). Significant relationships were found between these meanings and the presence of these three primary colors.

Introduction

Scholars and artists have long discussed the nature of color, but failed to find a generally accepted system to denote specific colors until the 1930s. Since then professionals have used a three-color model in photography and printing to accurately reproduce colors. Strangely enough, this common industrial model is virtually never used by communication scholars and fine artists. Instead, they typically reply on earlier and less satisfactory models. This paper argues that the use of this industrially accepted color model could greatly benefit scholars who conduct color-related research.

Models Of Color Denotation

The modern notation of color began three centuries ago when Newton created his color wheel from the seven colors he observed in the rainbow. Waller created a chessboard color system to more effectively portray tints, shades, and hues. In 1772 Lambert added a third dimension by graphing color in the form of a pyramid (Birren, 1969). A century later, Maxwell (1877), the discoverer of the electromagnetic theory of light, was the first to measure color quantitatively by the means of revolving colored disks.

These new theories encouraged others to reformulate how fine artists might perceive relationships among colors. Cheveul's *Principles of Harmony and Contrast of Colors* (1839) greatly influenced the Impressionist movement, and the theories of Wilhem Ostwald influenced the German Bauhaus' use of color. Ostwald was also a colleague of American professor and colorist Albert H. Munsell (1994). Perhaps because of his presence here, Munsell's system became most common in America. Today many American fine artists and communication scholars continue to use his system.

Unfortunately, there are at least four serious problems with the Munsell system. It tends to be *nominal*, *unbalanced*, *outmoded*, and *unconventional*.

Munsell's system uses nominal terms rather than interval levels to denote hues. Colors are merely noted in terms of being "red," "yellow," "green," "blue," and "purple."

This nominal system limits the ability to analyze research results. Nominal-level data limit the use of more powerful statistical techniques that permit interval-level data (Hays, 1988). Such nominal-level data also make it nearly impossible for researchers to determine precisely when a color changes from one hue to another. There is no instrument to determine when a green becomes a blue-green. The Munsell system has the possibility of colors being subjectively and inconsistently denoted.

The problem of being unbalanced is best seen in the "Munsell Students Charts" that accompany Munsell's *A Color Notation* (1988). In it there are ten charts, one for each hue. These ten hues are represented with anywhere from 20 color chips (e.g. yellow) to 30 (e.g. red) color chips. Besides this disproportionate representation of hues, there are also abnormal distributions of color chips within these charts. The patterns of these charts tend to be skewed. For example, the color chips for yellow are heavily skewed toward the bright top of their chart.

Such an irregular model is problematic. Statistical techniques that assume a normal distribution should be avoided with such abnormally distributed scales (Hays, 1988).

As to being outmoded, Munsell (1988) originally conceived his color notation in 1898 as a tool to teach his color-composition students. His system is based on his personal evaluation of the pigments of his day, and lacks an index for the vivid synthetic organic pigments of today (Mayer, 1985, p. 408).

Although Munsell's system is still a useful tool that enables artists and scholars to subjectively denote color, it predates modern instruments that can measure color objectively. Interestingly, Munsell's own publisher, Macbeth, sells color densitometers (Macbeth, 1989). These instruments measure color not with Munsell's notation, but in terms of a more current system described by the Committee on Colorimetry (1943, 1944a, 1944b, 1953) and discussed more fully below.

Regarding Munsell's system being unconventional, professionals (such as photographers and graphic artists) who need to precisely reproduce colors virtually never use the Munsell system—nor are they trained to. For example, a student can earn a bachelor's degree in color without once encountering the Munsell system (Brooks Institute of Photography, 1969).

Because these earlier models, such as Munsell's, were inadequate for commercial professionals who needed an objective, measurable model by which to reproduce colors accurately, color research intensified throughout the first half of this century. Industrial researchers continually returned to the premise that a full spectrum could be denoted in measurable terms by only two or three "primary" colors. For example, inventors between 1910 and 1930 worked on a large number of experimental color processes for movies, including two-color processes that dyed film red and blue-green. In 1932 the Technicolor Motion Picture Corporation introduced its three-color imbibition process in which dyes were transferred to the film's gelatin coating, with results superior to any two-color process. About the same time, Kodak introduced its Kodacolor film, using a similar three-color system. Today all color photography is based on this three-color principle (Mees, 1961).

Perhaps the best description of this three-color measurement of color is to be found in Hardy's *The Handbook of Colorimetry* (1936) and his subsequent article on the topic (1937). Following these publications, the Committee on Colorimetry of the Optical Society of America (1943, 1944a, 1944b, 1953) published a series of articles that present in measurable terms virtually the same denotation of reproducible colors.

Hardy presents the three subtractive primaries (cyan, magenta, and yellow) and their complementary secondaries (red, green and blue) in terms of their specific wavelengths. These six colors are based on the "tristimulus values of the spectrum colors" (Hardy, 1936, p. 7). This color model is now used universally by those who reproduce colors through photography, graphic arts, and broadcasting.

The three-color model of color notation has none of the problems found in the Munsell system. Because it is the foundation for the present professional notation of color, it is neither outmoded nor unconventional. Because it allows for the interval measurement of color, it has none of the problems of nominal-level data. And because it can measure all three of its color dimensions on identical scales (such as from 0 to 100 percent), it does not have the problems of Munsell's irregular model. On the other hand, the three-color model of color notation can denote all the colors of the Munsell system.

In spite of all these advantages, communication researchers rarely use this three-color system. An extensive review of the literature failed to find one example of its use.

For these reasons, I suggest the use of the three subtractive primaries (cyan, magenta, and yellow) be considered by scholars and researchers of color in the future in place of the use of the Munsell system.

Measuring the Meaning of Color

Osgood, May, and Miron (1975) provide one of the most important works on the meaning of color. From a wide variety of research, they summarize how different colors tend to elicit meanings of activity, potency, and evaluation.

Interestingly, although Osgood wrote the "color solid" analysis of colorimetry (1953, p. 129), he failed to address the quantitative measurement of color in his writings on the meaning of color. His findings lack the objective denotation of color discussed above.

Regarding the measurement of the meaning, Osgood encourages researchers to develop their own scales that are appropriate to each investigated topic: "[the] criterion in scale selection is *relevance* to the concepts being judged" (1978, p. 78). Osgood elaborates:

> [A]lthough there are, we believe, standard *factors* of judgment, the particular scales which may, in any given research problem, best represent these factors, are variable and must be carefully selected by the experimenter to suit his purposes (1978, p. 80).

In summary then, the first purpose of this present study is to show the viability of using the current industrial color system of cyan, magenta and yellow to denote a full range of color (hopefully avoiding the potential problems of Munsell's system). The second purpose is to use original scales, as recommended by Osgood, to examine the meaning of these colors.

Research Questions

Osgood (1975) found three basic dimensions of meaning—evaluation, activity, and potency. The first set of research questions (RQ1–RQ3) predicts that this present study will find factors similar to those three dimensions repeatedly found by Osgood. (It is assumed that each research question has a null hypothesis in which no significant results are predicted.)

RQ1 A factor will be found that is similar to Osgood's factor of evaluation.

RQ2 A factor will be found that is similar to Osgood's factor of activity.

RQ3 A factor will be found that is similar to Osgood's factor of potency.

The other group of research questions (RQ4–RQ6) predict significant relationships between these factors and specific colors, similar to the results found by Osgood, May, and Miron (1975, p. 327). In summary, they found that blue related to a positive evaluation, red to potency, and red and yellow to activity.

RQ4 Blue (cyan+magenta), and green (cyan+yellow) will connote positive evaluation.

RQ5 Red (magenta+yellow) will connote potency.

RQ6 Red (magenta+yellow) and yellow will connote activity.

Method

Sampling

Respondents were sought who approximately represented the general population. Intercepts in a variety of public locations (such as a restaurant, laundry, and grocery store) were used to contact respondents from in and around a major Midwest city. Questionnaires were completed by a total of 569 respondents during October, 1995.

Because this experiment was designed to measure the effect of color, a question was asked at the conclusion of the survey in order to detect those who were colorblind. The question asked people whether the respondent was colorblind, with the possible responses being, "yes," "slightly," and "no." The "slightly" option was included to detect those with partial colorblindness. Two respondents indicated that they were colorblind and 36 others indicated that they were slightly colorblind. The responses from these 38 people were deleted. Of the remaining 531 respondents, 323 indicated that they were female and 208 male. Ages ranged from 12 to 77, with the average age being 25.

Survey Instrument

Respondents were each randomly assigned a one-page (11" X 8.5"), horizontal questionnaire. On the top right of the questionnaire was the randomly colored trademark (the stimulus material). Below it was a sentence requesting the respondent to evaluate the trademark in terms of 57 scales. The

> gesture towards possibilities for self-definition that move beyond existing sets of social and political relations.

Radically oppositional claims have been made regarding cyberpunk literature. Many of the apparent contradictions stem from multiple conceptions of cyborg identity. In her influential *Cyborg Manifesto* (1985/1991), Haraway notes the ironic nature of the cyborg metaphor.

> From one perspective, a cyborg world is about the final imposition of a grid of control on the planet...about the final appropriation of women's bodies in a masculinist orgy of war. From another perspective, a cyborg world might be about lived social and bodily realities in which people are not afraid of their joint kinship with animals and machines, not afraid of permanently partial identities and contradictory standpoints.

From one perspective, as Karen Cadora (1995) points out, the image of the cyborg represents the total triumph of genocidal patriarchy. From another, it is "a multiply positioned subject enabled by technology." The image is one of both hope and terror. Mary Catherine Harper (1995) also discriminates between the liberatory effect the image of the cyborg is often seen to promote at the same time as it supposedly reinstates and further solidifies humanist subjectivity.

Crisis of the Body

One aspect of postmodern thought involves an information age crisis of the body, related to the pervasive dissolution of boundaries. It is a crisis of meaning and definition, stemming from the blurred relationship of the subject to his/her own body and bodily anxiety in the face of overwhelming technology. Bukatman tells us that evidence can be found in literature, philosophy, cinema, television, and comics of a movement away from the traditional experience of the body and toward some sort of ecstatic cybernetic fusion.

> The body must become a cyborg to retain its presence in the world, resituated in technological space and refigured in technological terms. Whether this represents a continuation, a sacrifice, a transcendence or a surrender of "the subject" is not certain. Elements of all three pertain, but in works as otherwise diverse as *Neuromancer* or *Max Headroom*, *Blood Music* or *Videodrome*, the condition of being is presently listed as terminal. (Bukatman, 1993)

The armored body has been depicted as compensating psychologically for a weak ego or the ego disruptions resulting from a blurring of identity. Arnold Schwarzenegger's pumped-up body has come to represent the figure of the cyborg in popular imagination. Most commonly the cyborg is represented as a killing machine (which can be ally or foe to humanity).

Crisis of the Subject

Back in 1983 (prior to the advent of public cyberspace), social theorist, Jean Baudrillard noted that in these postmodern times the subject has become a "terminal of multiple networks". This new subjectivity is at the heart of Scott Bukatman's book, *Terminal Identity: The Virtual Subject in Postmodern Science Fiction* (1993). Bukatman makes a marvelous play on words and images, forcing one to consider the "posthuman" bent of our evolution both as an *end* to current identities *and* as a reconstructed identification with the computer terminal (or even with a "terminator" of cinematic fame).

Cinematic Cyborg

Quite a bit of attention has already been paid to the cyborg images in films such as *The Terminator*, *Terminator 2*, and *Robocop*. While there is much to learn from the dominant cyborg hunter mythology (e.g., see Rushing and Frentz, 1995 and Bukatman, 1993), I am also interested in the somewhat more subtle cyborg images which are becoming increasingly prevalent in popular culture. Science fiction films are obvious sources for reflection of postmodern mythology. However, as the strength of this mythology grows, we can find it's influence more pervasively distributed in other genres. In this instance, I will use Barry Levinson's 1992 comedy film, *Toys*, as a case study.

Cyborg Plot

Keeping in mind that cyborg mythology concerns the relationship between humanity and technology in post-industrial information societies, I will begin by examining the cyborg discourse within *Toys*. This film has the underlying theme that "toys" can be life-affirming *or* life-destroying and that a deliberate effort (a battle on the "field of innocence") must be made to prevent our toys from being twisted toward corrupt purposes. A secondary point is that weapons *are* actually toys for the bloody-minded. Key elements of the film's plot which relate to the cyborg metaphor follow.

A quietly eccentric toy manufacturer, Kenneth Zevo (played by Donald O'Connor), is dying and he asks his rigid career-military brother, Leland Zevo (Michael Gambon), a three-star General, to take over the presidency of his toy company. We are quickly exposed to the opposition within the Zevo cyborg tradition, as Leland and Kenneth Zevo sit across a table in a confrontational truce to determine the fate of Zevo Toys.

Starting with a camera pan down the length of the General's decorated military figure, across his polished shoes, to a mechanical alligator pointing toward the lit-up novelty shoes of Kenny. When the camera moves back we soon see that he is wearing a beanie cap with a revolving propeller on top. It is connected to the implanted pacemaker which will soon fail to keep him alive.

Kenneth makes this request of his antithetical brother (their father's favorite), even though he has a grown son, Leslie Zevo (Robin Williams), and daughter, Alsatia Zevo (Joan Cusack) who are both completely devoted to the toy factory and his whimsical ideals. He explains that Leslie does not have the ambition or feel ready to take on the responsibility of leadership and Alsatia is... well... He leaves it unsaid, but we soon find out that she is a space-cadet (among other things).

The General must consult with his bed-ridden, imbecilic, *four*-star General father (Jack Warden) before taking over the company. Eventually Kenneth is buried, along with his activated "Barrel of Laughs", some other novelties, and some extremely long-lasting batteries. Leslie and Alsatia ride to and from the funeral in a bumper car.

The General enlists his son, Patrick Zevo (LL Cool J), also career military, to help him overhaul the business, starting with security operations. He becomes inspired by the possibilities for creating war toys and starts a secret research division to develop and test them. It quickly begins to usurp more and more of the factory space, literally squeezing the "happy workers" out. Besides the new security personnel, most of the worker replacements are children who are testing video wargames in the secret restricted area and inadvertently training themselves to be destructive cyborgs.

Leslie determines that he must break into the restricted area to see for himself what threat it represents to the ideals of Zevo Toys. He is discovered and battlefield lines are drawn. In a hopeful twist during the last part of the film, Patrick switches loyalties to Leslie and Alsatia. His allegiance changes when he becomes enlightened as to a deception on the part of his father regarding the nature of his mother's death. He tells his father "I came real close to being just like you." Leslie finally stands up to his uncle, physically fighting back and stating "and you thought I was a *fool*... I will *not* let you destroy Dad's dream."

The film can easily be seen as a hero's journey, wherein Leslie is forced into making the hero's initiation quest through dark and perilous waters, successfully battling the monstrous other (the military machine in progress, embodied in an experimental sea swine cyborg and culminating in a toy war), and eventually emerging as a capable leader. His father had hoped such a confrontation would prove the key to Leslie's growing up.

Cyborg Characterizations

Who is the cyborg in this film? In films such as *The Terminator* and *Terminator 2*, it seems apparent. A more appropriately-rest of the page was filled with two columns of scales. An example of the survey instrument with a medium gray trademark is included at the end of this article.

For at least four reasons it seemed appropriate to use a familiar context, such as a trademark, as a vehicle by which to present colors. First, trademarks are ubiquitous in American culture, so there is ecological validity in their use. Second, because a trademark may consist of different elements—such as typography—color as an independent variable may be somewhat masked from the respondents. Third, respondents can project their responses onto the personality of the company that would use such colors. Fourth, national trademarks are registered with the Department of Commerce, so one may compare these results with the colors actually registered. (Interestingly, only seven nominal colors may be registered—"red," "orange," "yellow," "green," "blue," "purple," and "other"—besides the achromatic black, white, and gray.)

Because of these reasons, it was decided to present the colors to be evaluated in the form of a trademark. The initials for the fictitious "BFH" company were selected at random. The selected typeface was Cooper Black—a heavy typeface that provided more inked area on the page for the colors being tested. No other logo or graphic element was included. All the trademarks were presented on the solid white background of the questionnaire.

A unique color was found for each trademark on the 569 questionnaires completed. In an extensive review of the literature, this is the only example found where random, interval-level color was used. Each trademark was printed in only the three subtractive primary colors—cyan, magenta, and yellow. Using a computer program to generate random numbers, random amounts of these three primary colors were found for all 569 questionnaires. Each uniquely colored trademark was then coded with a six-digit identification number that indicated the percentage of each color. For example, questionnaire number "69-42-63" indicates 69 percent cyan, 42 percent magenta, and 63 percent yellow.

Colored trademarks were printed by an ink-jet printer. Tests were conducted to compare how well these assigned colors matched their counterparts from the *Pantone Process Color Selector* (1983)—a book designed to specify such colors. The ink-jet printed colors had the same appearance as their corresponding Pantone example. This confirmed that the trademark colors do appear as they are supposed to, and that such an experiment could be successfully replicated later.

Regarding scales, there were three sources used in compiling semantic terms to be used for this study. The first was used to include those terms that are expected to be communicated by actual colored trademarks. A previous survey (Johnson, 1994) of 125 corporate executives of *Fortune* 500 companies asked the open-ended question as to what specific qualities their trademarks were meant to connote. The participants responded with 14 different terms that became the bases for this study's scales.

Next, to find whether the random colors being evaluated in this study connote the same meanings as had been found in previous research, the writings of Charles Osgood, May and Miron (1975) regarding the meaning of color were used as this second source.

A final source was included in an attempt to ensure are many meanings were included as possible. For this last source, responses were gathered from 16 visual communications students who had been asked what these randomly selected colors meant to them.

The lists of semantic terms from these three sources were compiled. Duplicate meanings were eliminated. Because the term "feminine" was included, its polar opposite "masculine" was also eliminated. This resulted in a final list of 57 different semantic terms (the complete list is available from the author). The 57 semantic terms were placed in alphabetical order to avoid a possible pattern of positive and negative evaluative terms.

The scales used with these terms reflect two modifications made by Zillmann (Johnson, 1995) to the Osgoods' (1978) original semantic differentials. One change is that the scales extend to "10." One advantage of this is that it allows a greater possible range of responses. Another advantage is that people are accustomed to making evaluations on a decimal-based scale. The other change is that each scale has only one semantic term rather than a pair of polar-opposite terms. New scales offered a range of agreement with each single semantic term, from "not at all agree" (1) to "extremely agree" (10). This eliminates any possible disagreement as to the selection of pairs of terms being polar opposites.

Settings

As the writings of Albers (1963) shows, adjacent colors can have a substantial effect on each other. For this reason, care was taken to ensure that no other color than the trademark appeared on each white questionnaire. The only other thing to appear on the questionnaire were the scales and instructions, which were printed in black.

Although adjacent colors can affect perception, previous research by Land (1959, 1977) shows that the human eye radically adjusts to widely different light sources. This is why people perceive white paper as white, whether it is viewed under green fluorescent, yellow incandescent, or blue north light; whereas conventional color photographs taken under these diverse settings would show marked color shifts. For this reason, no extraordinary precaution was taken to alter the light sources of where these trademarks were viewed.

Results

Five Factors of Color

To test the first three research questions (RQ1–RQ3), factor analysis was used to explain the relationship among the scales in terms of their underlying factors. The overall measure of sampling adequacy (MSA) was .94 with the lowest being .83. (An MSA score of .80 is generally considered more than adequate.)

The Kaiser method (Rummel, 1970) was used to determine the number of factors to examine. In this method, only factors with eigenvalues greater than 1.00 are retained. Five factors were found that met this criterion. The skree chart was also examined to confirm the soundness of this number of factors.

The rotation used was Varimax (the most common form of rotation). Scales with a factor loading of .60 or greater were kept to represent these factors in subsequent analysis. Thirty-two scales had loadings of .60 or greater on these five factors.

Chromebach's alpha was used to examine the scales that constitute each of these factors. The results appear sound, with the five factors having an average Chromebach alpha score of 0.86 and a range from .95 to .76. These five factors account for 90 percent of the total variance examined in this research (the full table is available from the author). Below is a summary of each of these five factors.

"Activity" is the phrase selected to describe the first factor, and it clearly supports the second research question (RQ2) regarding "activity." The terms from 13 scales loaded most heavily (with loadings of .60 or greater) onto the first factor. These semantic terms are "vibrant," "wild," "upbeat," "youthful," "energetic," "unique," "trendy," "innovative," "new," "sexy," "modern," "refreshing," and "sociable." The phrase "active" was subjectively selected to name this factor. This first factor accounts for 46 percent of the variance examined in this factor analysis.

"Up scale" is the phrase selected to describe the second factor. Six terms loaded most heavily onto the second factor. These terms are "rich," "professional," "sophisticated," "quality," "regal," and "serious." This second factor accounts for 19 percent of the variance examined in this factor analysis.

The third factor is named "nice." The six more terms that constitute this factor—"soft," "gentle," "cozy," "quiet," "calm," and "pleasant"—may also represent impotence, supporting the third research question (RQ3) regarding "potency."

"Worn out" is the phrase used to describe the fourth factor. It comprises the terms "depressing," "tired," "musty," and "tacky." It accounts for nine percent of the variance examined, and it is the factor that represents a most negative evaluation.

"Brassy" is the phrase used for the last factor. It contains only three terms—"big," "bold," and "blunt." It accounts for only four percent of the variance.

There is no one factor that decidedly represents evaluation, and so the first research question is not clearly supported. One could argue that the first three factors—activity, up scale, and nice—all represent different aspects of positive evaluation. In the same way the last two factors—worn out and brassy—may be seen as reflecting negative evaluation. The support for such speculation, though, seems questionable.

In summary the second and third research questions regarding activity and potency are specifically supported by these results. On the other hand, the first research question regarding evaluation is not specifically supported.

Five Meanings of Color

To examine the meaning of color, a single score—ranging from 1 to 10—was found for each of the five factors described above. This was done by finding the mean score of the words that constitute each factor. These mean scores were then used as dependent variables in further statistical analysis.

The independent variables were the random percentages of the three primary colors present in each questionnaire's trademark. Regression was selected as the most appropriate statistical technique to use to test the relationship between these factors and colors. Because it was believed that there may be curvilinear relationships between these sets of variables, quadratic as well as linear relationships were examined.

The stepwise method was used to select those independent variables (colors) that would best predict scores for each of the factors. For conciseness, only those models are reported here that have the greatest number of statistically significant colors. An alpha level of .05 was used to determine which colors to use as significant predictors in each regression model.

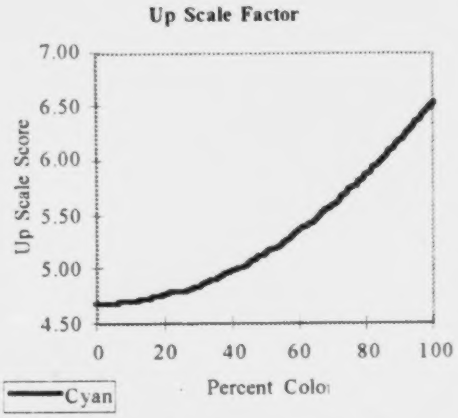
The standard statistical assumptions for regression were checked. It was found that many of the respondents tended either to agree strongly or disagree strongly with the terms used on the survey's scales. This high frequency of responses toward the extremes of the scales resulted in a distribution flatter than the conventional bell curve. Scores for kurtosis range from –.55 to –.82, which significantly depart from the normal distribution. These abnormal distributions are reported here, with the original data scores being used in a conventional manner in the regression technique and reported below.

Cyan means up scale (Figure 1). The greater the percentage of cyan used in a trademark, the higher its company tended to be evaluated in terms of being up scale.

Figure 1
Summary of Stepwise Regression Analysis for Variables Predicting the "Up scale" Factor (N = 503)

Variable	*B*	*SE B*	β
Intercept	4.36	0.13	
Cyan^2	>0.01	>0.01	.26*

Note. R^2 = .07
*$p < .05$



The greater the presence of yellow and magenta used in a trademark, the lower its company tended to be evaluated in terms of being nice (Figure). If one were to accept that these "up scale" and "nice" factors are analogous to Osgood's factor of positive evaluation, then these results support the fourth research question (RQ4).

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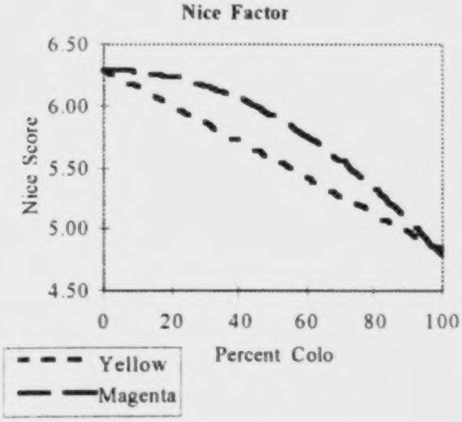
Figure 2
Summary of Stepwise Regression Analysis for Variables Predicting the "Nice" Factor (N = 514)

Variable	*B*	*SE B*	β
Intercept	6.29	0.22	
Yellow	−0.01	>0.01	.19*
Magenta^2	−0.01	>0.01	.19*

Note. R^2 = .07
*p < .05

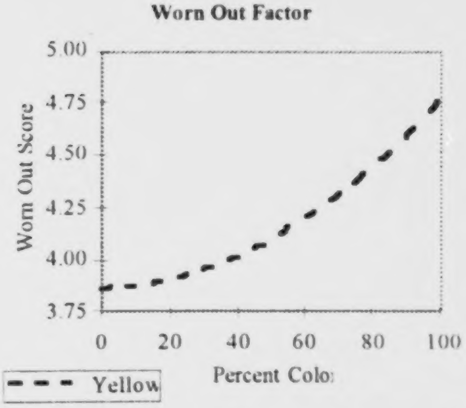


Yellow means worn out. The greater the percentage of yellow used in a trademark, the higher its company tended to be evaluated in terms of being worn out (Figure 3). If the "worn out" factor is analogous to potency, the results fail to support the fifth research question (RQ5).

Figure 3
Summary of Stepwise Regression Analysis for Variables Predicting the "Worn Out" Factor (N = 511)

Variable	*B*	*SE B*	β
Intercept	3.87	0.14	
Yellow^2	>.01	>.01	.12*

Note. R^2 = .02
*p < .05

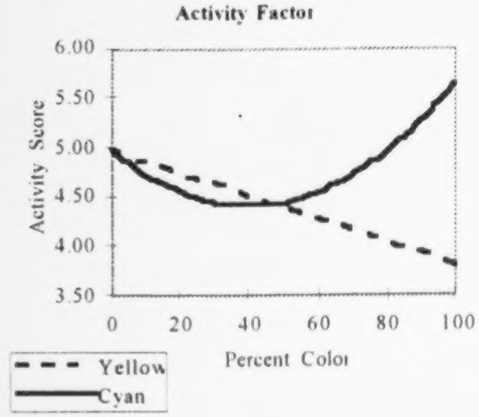


Contrary to the sixth research question (RQ6), the presence of cyan and absence of yellow mean activity (Figure 4). The greater the percentage of yellow used in a trademark, the lower its company tended to be evaluated in terms of being active. On the other hand, there was a curvilinear pattern found with the color cyan. Companies tended to be evaluated the lowest in terms of activity where there is about 40 percent cyan used, but evaluated highest with 100 percent cyan.

Figure 4
Summary of Stepwise Regression Analysis for Variables Predicting the "Activity" Factor (N = 511)

Variable	*B*	*SE B*	β
Intercept	4.96	0.32	
Cyan	−0.03	0.01	.16*
Yellow	−0.01	>0.01	.11*
Cyan^2	>0.01	>0.01	.09*

Note. R^2 = .05
*p < .05

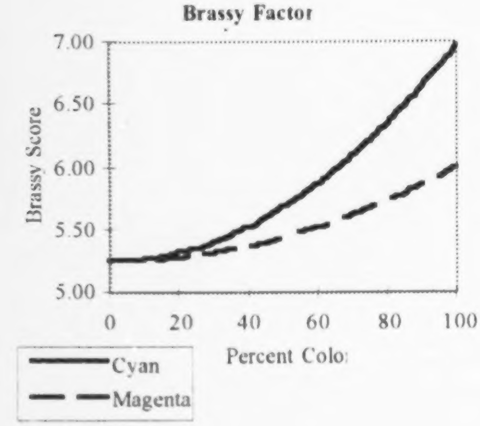


Cyan and magenta mean brassy (Figure 5). The greater the percentage of cyan and magenta used in a trademark, the higher its company tended to be evaluated in terms of being brassy.

Figure 5
Summary of Stepwise Regression Analysis for Variables Predicting the "Brassy" Factor (N = 515)

Variable	*B*	*SE B*	β
Intercept	5.25	0.20	
Cyan^2	>.01	>.01	.20*
Magenta^2	>.01	>.01	.08*

Note. $R^2 = .05$
$^*p < .05$



Discussion

The first purpose of this study is to show the viability of using the commercial primary colors of cyan, magenta, and yellow in doing scholarly research. These results show that this color model can be successfully used, with all the benefits described previously. Among them is the ability to use interval measures of color in higher statistical analysis.

The second purpose is to examine the meaning of these three colors. The results related to this are discussed below.

Color Factors

The factors found in this study appear to generally approximate the findings of Osgood (1978). The first research question (RQ1) is not clearly supported. Whereas there was no one factor found that clearly represents Osgoods' evaluative factor, it could be argued that "up scale" and "nice" are aspects of positive evaluation.

The second research question (RQ2) was supported, with this study producing a factor for activity, as Osgood had also previously found. The third research question (RQ3) also seems to be supported, with the factor of being "worn out" relating to potency.

Meanings of Colors

The meanings found in this study are only somewhat successful in approximating the findings of Osgood (1978). The presence of cyan in trademarks that scored higher as being up scale and nice supported the fourth research question (RQ4). This is in line with several of our culture's clichés, such as royal blue, true blue, and blue blooded.

The presence of yellow related to being worn out, which fails to support the fifth research question (RQ5). Yellow (along with magenta) make red, which Osgood's finding suggest should mean potent. Perhaps respondents tend to recognize yellow as an index of deterioration. They may find yellow reminds them of items that are worn out, such as old yellow papers or clothe.

The respondents to this survey tended to see companies as being more active when the trademarks contained a substantial amount of cyan while lacking yellow, failing to support the sixth research question (RQ6). While there is no obvious reason why these results should be different from Osgood's, there are a number of possible explanations, discussed below.

Practical Significance.

Although these regression results may be statistically significant, there remains the question as to their practical significance. The amount of variance accounted for in each of these regression models ranges from only two to seven percent (R^2 = .02 to .07).

This suggests that the color of trademarks has a slight, albeit statistically significant, effect on how people evaluate companies. For example, these results predict that changing certain colors may tend to cause people to change their opinion of a company by a point or so on a ten-point scale. Although such a change may be subtle, it could still prove substantially beneficial to that company.

Color is only one element in the whole gestalt of a trademark. It works with the other elements, much as the rhythm section of a band supports a song's melody. The use of color in a trademark can harmonize the other graphic elements to present a pleasing, unified message. Just as a slight change in a tertiary note in music can change a chord from major to minor, so the discord in the graphic elements of a trademark may disrupt its intended meaning. The musician has the advantage of already having a generally accepted, codified set of chords that become the basis for his or her creativity. The graphic artist lacks such an advantage and must rely solely on his or her intuition in assembling a visual image. The result of this research is offered as a tool to help the commercial artist. It offers a guide to selecting colors that may better harmonize with a company's intended image.

Theoretical Rationale For these Findings

Although Osgood spent his life seeking universals of meaning (1975), he never claimed to have found them—not even for color. Part of the reason may be due to the fact that color is often an arbitrarily assigned symbol (Buchler, 1955, p. 112). The meaning of color may vary with time and convention.

As an example of the temporary aspect, the Color Association of the United States and the Color Marketing Group annually predict each year's fashionable colors. Samples of these colors are published each year in *Communication Art*. As this temporal aspect dictates a change in colors—indicating current as opposed to passé items—so too may other meanings of color, such as activity, be transient over time.

Convention is another arbitrary aspect. Perhaps several actual companies in one industry also share one predominant color in their trademarks. Respondents may be conditioned to recognize this association between color and industrial factor, where they may fail to recognize such a relationship in other items, such as the ones Osgood describes.

Yet another reason why the Osgood's findings are different from these findings is that the denotation of cyan, magenta, and yellow may have revealed more information than was possible previously with less precise colors.

A final possibility of the difference in findings may be that the scales used in this present study offer a different fit for the true underlying meanings of color in trademarks. If so, then this is an example of the very reason why Osgood advocated using original scales rather than standardized factors.

Implications

There are two main implications from these results. The first is for the commercial artist. When there are opportunities to select colors for trademarks, the artist may want to consider the possible meanings of color found in this study. The second implication is that these results show the viability of using the measurement of cyan, magenta, and yellow in academic research. This study calls for the use of the professional color model of cyan, magenta, and yellow to become the conventional measure in future scholarly research of color.

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BFH

Number: 50-50-50

Please circle the most appropriate number to indicate how strongly you agree that each word describes the BFH company.

	Not at all agree									Extremely agree
1. Adventurous	1	2	3	4	5	6	7	8	9	10
2. Attentive	1	2	3	4	5	6	7	8	9	10
3. Beautiful	1	2	3	4	5	6	7	8	9	10
4. Big	1	2	3	4	5	6	7	8	9	10
5. Blunt	1	2	3	4	5	6	7	8	9	10
6. Bold	1	2	3	4	5	6	7	8	9	10
7. Boring	1	2	3	4	5	6	7	8	9	10
8. Calm	1	2	3	4	5	6	7	8	9	10
9. Classy	1	2	3	4	5	6	7	8	9	10
10. Clean	1	2	3	4	5	6	7	8	9	10
11. Confident	1	2	3	4	5	6	7	8	9	10
12. Conservative	1	2	3	4	5	6	7	8	9	10
13. Cozy	1	2	3	4	5	6	7	8	9	10
14. Earthy	1	2	3	4	5	6	7	8	9	10
15. Depressing	1	2	3	4	5	6	7	8	9	10
16. Energetic	1	2	3	4	5	6	7	8	9	10
17. Feminine	1	2	3	4	5	6	7	8	9	10
18. Gaudy	1	2	3	4	5	6	7	8	9	10
19. Gentle	1	2	3	4	5	6	7	8	9	10
20. Innovative	1	2	3	4	5	6	7	8	9	10
21. Hostile	1	2	3	4	5	6	7	8	9	10
22. Inviting	1	2	3	4	5	6	7	8	9	10
23. Leader	1	2	3	4	5	6	7	8	9	10
24. Modern	1	2	3	4	5	6	7	8	9	10
25. Musty	1	2	3	4	5	6	7	8	9	10

	Not at all agree									Extremely agree
26. Mysterious	1	2	3	4	5	6	7	8	9	10
27. New	1	2	3	4	5	6	7	8	9	10
28. People-oriented	1	2	3	4	5	6	7	8	9	10
29. Plain	1	2	3	4	5	6	7	8	9	10
30. Pleasant	1	2	3	4	5	6	7	8	9	10
31. Precise	1	2	3	4	5	6	7	8	9	10
32. Professional	1	2	3	4	5	6	7	8	9	10
33. Quality	1	2	3	4	5	6	7	8	9	10
34. Quiet	1	2	3	4	5	6	7	8	9	10
35. Refreshing	1	2	3	4	5	6	7	8	9	10
36. Regal	1	2	3	4	5	6	7	8	9	10
37. Rich	1	2	3	4	5	6	7	8	9	10
38. Romantic	1	2	3	4	5	6	7	8	9	10
39. Serious	1	2	3	4	5	6	7	8	9	10
40. Sexy	1	2	3	4	5	6	7	8	9	10
41. Sociable	1	2	3	4	5	6	7	8	9	10
42. Soft	1	2	3	4	5	6	7	8	9	10
43. Sophisticated	1	2	3	4	5	6	7	8	9	10
44. Sterile	1	2	3	4	5	6	7	8	9	10
45. Strong	1	2	3	4	5	6	7	8	9	10
46. Stuffy	1	2	3	4	5	6	7	8	9	10
47. Sympathetic	1	2	3	4	5	6	7	8	9	10
48. Tacky	1	2	3	4	5	6	7	8	9	10
49. Tired	1	2	3	4	5	6	7	8	9	10
50. Traditional	1	2	3	4	5	6	7	8	9	10
51. Trendy	1	2	3	4	5	6	7	8	9	10
52. Trustworthy	1	2	3	4	5	6	7	8	9	10
53. Unique	1	2	3	4	5	6	7	8	9	10
54. Upbeat	1	2	3	4	5	6	7	8	9	10
55. Vibrant	1	2	3	4	5	6	7	8	9	10
56. Wild	1	2	3	4	5	6	7	8	9	10
57. Youthful	1	2	3	4	5	6	7	8	9	10

Finally, three last questions about you:

58. What sex are you? 1) Female____ 2) Male____
59. Are you color blind? 1) Yes____ 2) Slightly____ 3) No ____
60. What is your age? _______

Thank you very much for your help!

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An Opportunity For Visual Literacy In The K–4 Classrooms Of Ohio

By Colleen M. Sexton and John C. Belland

Abstract

The Ohio SchoolNet Plus initiative provides $400,000,000.00 to transform K–4 public classrooms in Ohio with computers, software and professional development. This dramatic change affords the opportunity to introduce visual literacy concepts into primary education. Some preliminary efforts have been made, but substantial additional work remains to be done.

Scenario

On Tuesday morning, the third grade students in Ms. A's room were clumped about the room, some around a white board, some madly scribbling on paper, and others gathered around a computer monitor. This was not a special morning but rather typical of the kind of work the children in Ms. A's class do. The project for the past few days was to prepare an electronic program for the school's Spring Dinner Theater. The students that were collaborating with a group of sixth graders who produced the printed play program, were gathered around the white board refining their interview questions for the student actors in the play. The group scribbling on papers were brainstorming possible layouts for their electronic program. Cooperation among all by accepting and listening to each other's ideas brought forth a creative layout design that morning. The group around the computer monitor were actively engaged in a discussion about a drawing created by one of the students using drawing software on the computer. Communicating their ideas, listening to one another, and sharing constructive comments led to the creation of a beautiful opening page for their electronic play program. By opening night the students had created a Hyperstudio document with buttons that led to a separate page about each student actor or helper involved in the play. As guests entered the school, waiting for their table, they could sit at one of the four computers set up in the hallway, go through the Hyperstudio stacks, and read about the evening's performers.

What indicators of success could Ms. A identify through projects such as these? While the end product has value in teaching particular concepts within given disciplines, skills typically learned though not planned for arise. Ms. A believes it is important to eliminate this hidden curriculum and to openly plan for and create opportunities where lifelong learning skills can be fostered. Projects such as the electronic play program provided students the opportunity to collaborate by recognizing that one can learn from the experiences others bring to the learning environment. Cooperative skills which are necessary to come to group consensus on particular concepts were emphasized in this project. They enhanced the interactive experiences, decreased competitiveness, and promoted a more collaborative view of learning. Communication skills grew as the students clearly articulated their ideas and understandings of the work done by others.

Ms. A believes that all of her students can learn, that each may not learn the same way or the same things, and that it is important to give each student a variety of opportunities to demonstrate how he or she is smart. She tries to provide experiences that are meaningful to the learner, to encourage the student to make real decisions, and to provide the students opportunities to refine their thinking and deepen their understanding of a concept. This occurs by developing understandings of concepts within real world contexts so that each student constructs her or his understanding of the concept by direct experiences. This constructivist philosophy of learning underpins each experience Ms. A shares with her third grade students.

Wouldn't it be wonderful if Ms. A were cloned; that all children could be actively engaged learners; that all classrooms were learning environments that used multiple tools to assist learners in creating richer understandings of concepts; that communication among learners was increased so that teachers could listen for misconceptions; and where all learners could have quick access to current information. A strong desire to create these powerful learning environments exists among many of the stakeholders involved in education in Ohio.

SchoolNet Initiatives

The initial catalyst for this dramatic change was a program known as SchoolNet. The SchoolNet initiative enables every classroom within school buildings to be networked for voice, video, and data access. The school districts identified as "low wealth districts" by the state also receive a workstation for each of their classrooms. The SchoolNet funding, however, does not address the need for connectivity between participating schools. It is the responsibility of individual districts to support this connectivity.

An extension of SchoolNet was a focus on K-4 learners called SchoolNet Plus. It is believed that exposure to computer technology during the primary grades will promote lifelong learning habits that will follow a child throughout their formal years of schooling and beyond. Through this initiative school districts were allocated funds to provide one computer workstation for every five children in grades K through 4, provide appropriate software, and conduct professional development for teachers. To date out of the 611 school districts within Ohio, 578 districts have applied for SchoolNet funding and well over 550 of these are actively moving forward with their plans for implementing the computer technology into their teaching and learning environment.

The SchoolNet Plus initiative is not strictly about hardware. It is designed to create learning environments such as the one provided by Ms. A. Any school district applying for their SchoolNet Plus allocation must have in place a technology plan. This plan should reflect the philosophy which underpins the use of technology in the classroom. Each district is required to complete an application which paints a picture of how they see their philosophy being put into practice. School districts are asked to explain how they believe: technology can be a catalyst for change, how the student's role will be different, how the teacher's role will change, how the use of technology in the classroom fits into the district's continuous improvement plan, and how they describe a technology-rich learning environment. Districts are asked to describe the kinds of things that will be happening in the classroom as a result of the addition of computers, and most importantly to describe their present benchmarks and their future indicators of success.

School districts are encouraged to think "outside of the box" with this application, while raising proficiency scores is an important indicator of success for educators in Ohio, one must ask if it is the only measure? Placing a computer in a classroom may make a student more efficient. It can provide access to multiple resources previously not available. It can assist with communication skills, and so on and so on, but that alone will not raise test scores. Lifelong learning skills, like those fostered in Ms. A's room, are more readily achievable goals that ultimately can impact on increasing proficiency scores.

Of course to reach such goals, Professional Development is of vital importance. The SchoolNet Plus initiative allows school districts to make decisions on how to spend their allocation. They are strongly encouraged to divide their funds among hardware, software, and professional development. Conditions within some school buildings prompted the legislators to allow school districts to apply up to 10% of those dollars toward electrical wiring upgrades.

Professional development can come in many forms. Some districts are opting for the initial quick fix, teach teachers how to turn on the computer, how to use various software applications, and what to do when minor problems arise. The thinking along these lines tends to be, get them on technology first, get them comfortable with it, then we'll worry about how to integrate it into the classroom. Another group believe in one-stop shopping—give your allocation to a vendor who will provide hardware, training, and a packaged curriculum with varying degrees of adaptability to the existing curriculum. This quick fix eliminates the multitude of decisions that must be made when integrating technology into the curriculum effec-

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tively. The benefits and downsides of this decision are a subject for a doctoral dissertation. A third approach to professional development has been a combination of technology and philosophy; training on the hardware, reflective and thought provoking discussions about software purchases, and cooperative development of lessons designed to integrate new tools into the teaching and learning environment.

The SchoolNet office has supported a variety of training opportunities within regional communities throughout the state. Local decisions guided the types of professional development opportunities during the Summer of 1996. During the 1996–97 school year, regional SchoolNet Faculty are supported throughout the state with the charge of assisting districts with technology-related concerns and creating opportunities for teachers to become more effective in integrating technology into their teaching. Teachers within districts throughout the state are taking part in team action research projects with additional state funding to study the impact technological applications have on their learning environment. The SchoolNet office entered into a contract with the Eisenhower National Clearinghouse for Science and Mathematics resources to co-develop with local teachers a template for evaluating K-4 science and mathematics software, to train representative teachers from each region of the state on how to use the template, and to work with that trained group to evaluate the software available to the Clearinghouse. The results of those evaluations are found on a web site sponsored by the Clearinghouse and designed to call up entries from a variety of categories. The trained teachers are charged with either creating opportunities to train additional teachers within their district on how to use this template to evaluate mathematics and science software, or they can charge individual school districts to provide this service for them as the district begins to make decisions on software purchases with their SchoolNet Plus dollars.

The SchoolNet Plus initiative is moving into its second round of funding. Initially the state allocated $122 million dollars for the districts to be distributed at $171.79 per K-4 ADM (average daily membership, equivalent to enrolled students). The second round of funding is for $150 million. An additional $125 million is expected in future allocations. The first round of dollars were available to all school districts, the legislation for the second round targeted 459 out of 613 districts based on the following criteria: 1) have an FY95 adjusted valuation per pupil below $110,000 and an FY94 adjusted expenditure per pupil below $5,218, 2) have an FY96 total ADM of at least 9000 and an FY95 ADC percent of at least 18%, or 3) have an FY95 adjusted valuation per pupil below $60,000. Non-targeted districts are expected to provide a dollar for dollar match to access their funds. To assist non-targeted districts, we have defined a match as any money spent by the district since the SchoolNet Plus legislation was enacted. So long as they can demonstrate that they have spent a given amount of money they can receive an equal amount not to exceed their identified allocation.

As we move into the second round of funding, we want to obtain a clear picture of where each district is in moving their technology plan forward. To this end, we have designed the second round application to be an accounting of where each district is, what is happening in individual K-4 buildings within the district, and where the K-4 teachers are in their skills with technology and in applying them in their classroom. It would be ideal if all districts could simply pull the application off of our web site or from the special list server we have set up to field SchoolNet Plus questions and concerns. However, until all have access we've opted for sending each district a disk with the questionnaire on it. The district liaison, typically the technology coordinator, will complete one section; each K-4 building principal will electronically complete a second section; and each K-4 teacher will be asked to complete a questionnaire on an electronically-read response sheet. These data will provide an understanding of how the first year monies were distributed among hardware, software, staff development, and electrical upgrades, as well as provide a baseline for comparison once future allocations for SchoolNet Plus are appropriated by the legislature.

We are convinced that technology can be a catalyst to invigorate the learning environment. Rich powerful learning experiences can be created through proper implementation of multimedia tools. The SchoolNet Plus legislative initiative in Ohio may state that schools must strive for a 1 to 5 computer to student ratio, but while reaching that goal we've created something much more dynamic. The computers create a physical presence which can not be ignored A presence, that when properly used, can develop and enhance lifelong learner skills for all learners regardless of age.

Implications—Visual Literacy

Just because there is an enormous infusion of technology into kindergarten through fourth grade in every public classroom in Ohio, this does not necessarily mean that any attention will be given to visual literacy. In fact, in some situations, the policy-makers in local districts have chosen to purchase so-called integrated learning systems which focus on the tutorial presentation and drill/practice of very traditional curriculum content in the form of compartmentalized knowledge. However, since the equipment standard for the machines to be purchased with SchoolNet Plus funds must be high-end versions of either Macintosh or Windows 95 machines (the processor speeds must be above 100 MHz, include a CD-ROM drive, and must have the PCI-bus architecture), these machines afford exciting possibilities for visual experimentation and visualization experiences.

Art objectives

For some teachers and learners, the technological environment will simply provide a new set of tools to use to be expressive in the visual realm. In these settings, the goals will be more oriented to artistic expression rather than explorations in visualization or generating explicit ideas about extracting meaning from different visual forms. Of course, if teachers and students reflect on the creative process used in generating the art and if they use critiques to encourage understanding of the pubic knowledge creation which can be associated with works of art at any level, then those visual literacy objectives which focus on producing and understanding images will be addressed in new and interesting ways.

For example, in the example provided above, Ms A's students used drawing and painting software to generate art to be used for the school's upcoming dramatic activity. It would be interesting to examine how the creation of art differs when executed on the computer as opposed to traditional tools available to primary-grade learners (Fein, 1993). In addition, if a scanner were available, it would be interesting to study just how young learners began to combine media in the computer workspace and to evaluate how the resulting images functioned in the school and personal lives of these learners.

Literacy objectives

During the time in school when traditional literacies are emphasized in the curriculum, it will be interesting to see if adding visual literacy experiences will prove useful in the development of learners' abilities. For example, will creating electronically based, illustrated stories increase the meaning young learners derive from written and spoken language. Can learners experience the idea that the images drawn by an adult to illustrate a story are only one possible alternative in visualizing the meanings of the story? What kinds of special meanings can only be expressed iconically? How can simple electronic photography and digital video help make meaning while encouraging self expression? What are the fundamental components of a visual language (Moriarity, 1994)? How are visual languages mediated by culture? Primary-grade learners in Ohio have access to extraordinary tools for these explorations.

Visualization objectives

There are innumerable opportunities for the development of visualization experiences with the computer platforms available to K–4 learners. Mental rotations can be externalized and modeled on the computer screen. Animations which zoom in on map details and which dynamically illustrate complex processes can be displayed under the control of the learner. Visual transformations such as from perspective views to orthographic ones can be animated as well so that young learners can begin to interpret diagrammatic information with fluency (Salomon, 1987). Just how these experiences will affect primary grade learners is not known, but there is work in progress by Philleo (1996) in mental rotations and location in space, and Wilkens (1996) in virtual reality which should begin to offer some understanding of the potential for these technologies. An example of Philleo's work is represented in Figures 1–3. In his work, young learners are asked to orient themselves in a representation of a school library media center. In Figure 1, the learner is looking from the outside of the media center through the door. Using animation software, the student is able to move her/himself through the door to explore the inside. Questions which ask the learner to anticipate what the layout of the media center will be using cues from the image and also from the floor plan shown in Figure three help the learner begin to comprehend differing points of view and accomplish mental rotations. Figure 2, which represents an interior view of the media center illustrates just one of the infinite number of views which learners can investigate on their computer screens. This work should build the sort of literacy which will help in orienting in space for map reading and the like.

Figure 1
VIEW FROM OUTSIDE THE LIBRARY/MEDIA CENTER

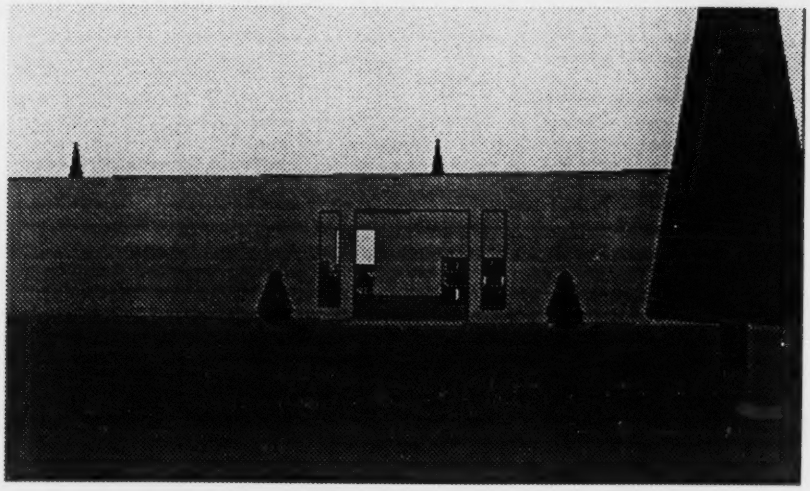

Figure 2
LEFT INTERIOR OF THE LIBRARY/MEDIA CENTER

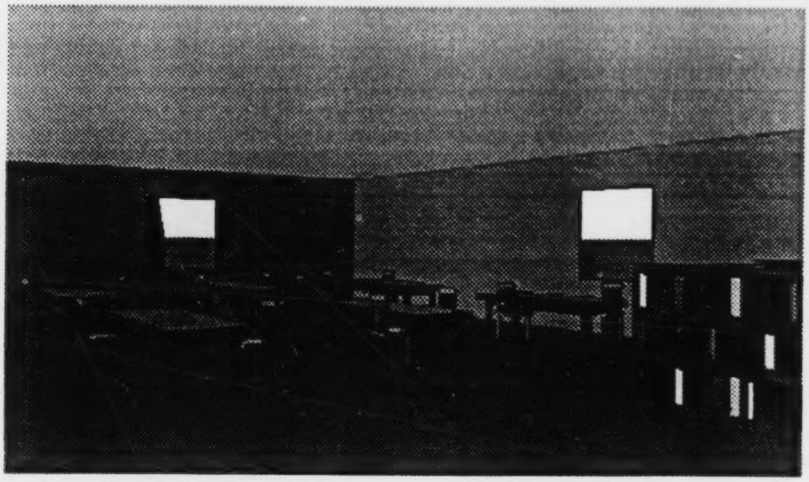

Image-processing objectives

Image processing allows inquiry into science and mathematics topics through the use of image transformations. Images which use colors to indicate elevation can be used to calculate very complicated things such as the volume of water in a pond or lake. Infrared images can be used to

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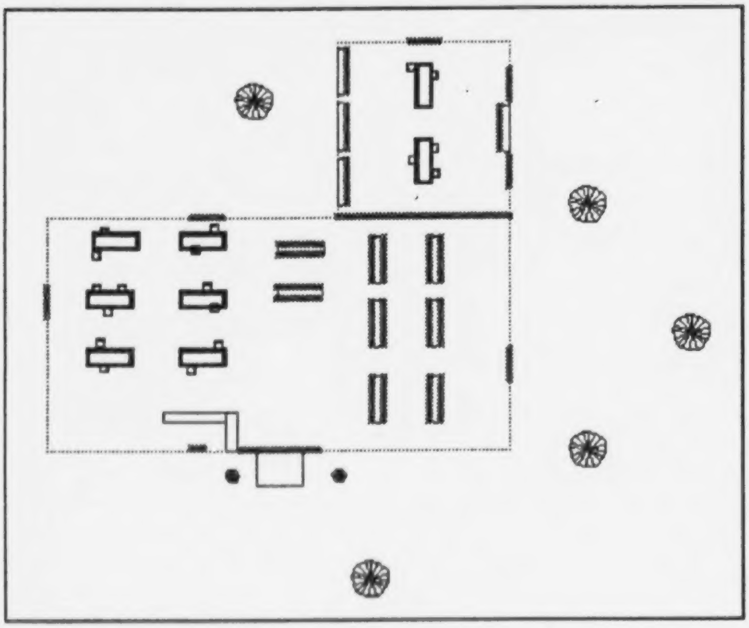
Figure 3
FLOOR PLAN OF THE LIBRARY/MEDIA CENTER



calculate energy use. Even if the objective is not calculation, imaging techniques can assist learners in separating figure from ground, finding animals in the dark, and many other things (Eisenhower Clearinghouse, 1995). User friendly image-processing software will run well on SchoolNet Plus computers. It remains to be seen whether teachers will avail themselves of the opportunities afforded by this set of techniques.

Conclusion

It is too early to tell whether the technological revolution in K–4 classrooms in Ohio will result in increased visual literacy. Substantial research and development is needed to ascertain what strategies, materials and purposes are the most powerful foci for increasing visual literacy. It is also necessary to find out what visual literacy strategies are developmentally appropriate for primary-grade learners. This paper is an invitation to all interested in visual literacy to understand the opportunity SchoolNet Plus has provided in Ohio. As this initiative is brought to life in all K–4 public classrooms in the state, there will be many ideas competing for attention as curricula are reformed to take advantage of the resources. What will visual literacy scholars contribute to this transformation?

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Visual Fidelity and Learning via Computer-Based Simulations

by Glen A. Holmes

Abstract

This paper is founded upon the belief that human behavior is observable, measurable, and predictable. Successful attempts to quantify behavior known to occur in learning environments such as the K-12 classroom may lead toward the development of useful tools that aid educational practitioners in refining their own pedagogical knowledge and skill. This paper proposes a strategy for investigating such an idea.

Introduction

Computers serve as convenient and efficient tools for modeling and analyzing the behavior of real systems -- in other words, conducting simulations. Whereas modeling describes what a system *is* (for example, appearance and technical specifications), simulation can demonstrate what a system *does*.

Visualization is also important when designing simulations. It is only after something is visualized that a simulation can be used to investigate its behavior (Adams, 1994). However, just how much visual detail is necessary to effectively communicate during a simulation is debatable. Some argue that, the more detail offered through visualization, the better the communication of ideas. Other suggest that details of the media used during simulation may interfere with the message being conveyed (McCloud, 1993). In the case of classroom behavior simulations, one might argue that increased levels of abstraction may allow users to more closely identify with characters (objects) of the simulation and, consequently, gain more from the learning experience.

Visualization adds measurement, color, quantification, qualification, and other attributes to abstract phenomena. It provides a sense of purpose, making concrete what otherwise, may exist only as a product of one's imagination.

Classrooms can be viewed as educational microsystems in which a variety of human behaviors (both teaching and learning) might occur. Likewise, effective classroom *simulations* can provide opportunities for end-users to study and/or analyze these behaviors and perhaps, serve a useful purpose in the preparation of teachers (pre-service and/or in-service) for real world experiences. The strategy proposed below is an aggregation of ideas associated with knowledge-based simulations, behavior observations, visualization, and the team approach to product development.

Knowledge Based Simulations

Knowledge-based simulations use special knowledge to boost run-time performance and fidelity, often relying upon disciplines such as game and probability theory for implementation (Adams, 1994). These type of simulations use predicate calculus and if-then reasoning to achieve results and are well suited for applications that predict the likelihood of an event's occurrence. By broadly defining a game to be *any* activity, enterprise, situation, or endeavor between or amongst humans and combining this with probability theory, speculative scenarios (e.g., classroom situations) can be analyzed.

Difficulties in Quantifying Human Behavior

One way to gather data on human behavior is through repeated observations followed by some technique to reduce and quantify the data collected. One such reduction technique is that of Flanders' Interaction Analysis. In this procedure, a recorder makes observations of classroom behavior and tallies the behavior according to some classification scheme -- either a *sign system* where only specific behaviors identified in advance are recorded, or a *category system*, where it is assumed that all behaviors, regardless of their nature, can be classified in some way. The behavior frequencies are then translated to a matrix (see Figure 1) for subsequent analysis. Typically, the overall observation period does not exceed 20 minutes with tallies being recorded at approximately 3-4 second intervals.

Figure 1
Example of behavior frequency count (left column) translated into behavioral analysis matrix (10 rows X 3 columns)

Behaviors Observed per 3-5 sec		1	2	3
5	1	x	xx	xx
3	2			xxx
4	3	x	x	xx
9	4	xxx	xxx	xxx
4	5		x	xxx
1	6	x		
2	7			xx
4	8	x		xxx
1	9		x	
5	10	xxx		xx

The category system is usually preferred over the sign system because of its dynamic nature and more exhaustive approach to quantifying behavior. Examples of verbal teaching behaviors include reinforcing, questioning, lecturing, and the like. Illustrative examples of student verbal behaviors include initiating, responding, and so on. Behaviors not falling within these general boundaries are said to be indicative of *noise* or *confusion* and are recorded as such.

Depicting Classroom Behavior Via Computer Simulation.

How can computers be used to visually, aurally, interactively, or otherwise, simulate classroom behavior? From a visual perspective, the answer to this question probably lies somewhere between the continuum represented by two-dimensional, stick-figure drawings and virtual space, combined with real-time knowledge systems (i.e., databases). Figure 2-4 illustrates three examples of where points along this continuum might exist.

Three-dimensional virtual reality (VR) constitutes the other end of the continuum and is an environment worth examining for its ability to add visual depth and meaning

Figure 2
Low Fidelity

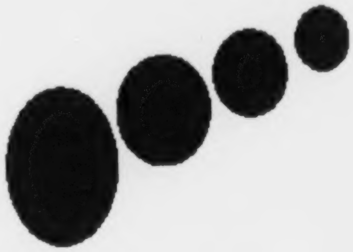


Figure 3
Medium Fidelity

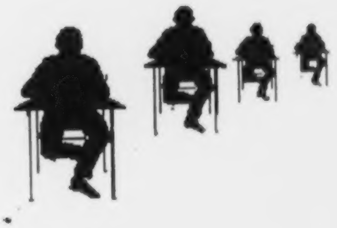
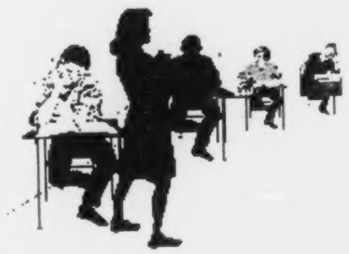


Figure 4
High Fidelity



to simulations. VR offers navigation and three-dimensional viewing of worlds in real time while allowing users to move with six degrees of freedom: forward/back, up/down, left/right, pitch up/down, angle left/right, and rotate left/right (Von Schweber & Von Schweber, 1995). The user's role shifts from being passive to that of becoming involved. As a clone of physical reality, users "exist" in three dimensions, experience reality in real time, and have the ability to interact with imaginary space surrounding them. Whereas interaction type (e.g., "fly-through" versus "reactive") defines a VR experience, level of interfacing (e.g., "through-the-window," "into the room," and "immersive") enhances it.

An ever-increasing number of computerized tools are emerging which offer assistance in building artificial worlds. Different products (*Cyberspace Developer's Kit, World ToolKit for Windows, VR Creator* and the like) support several types and levels of interaction and immersion. Many of these software tools allow linkages to be made between the finished product and external databases -- an essential feature for demonstrating and analyzing classroom behavior via simulation.

Developing a Plan of Action

Research Team. For the purposes of this project it was essential to organize a team of individuals with varying levels of experience and expertise. Toward this end, a core team has been formed and consists of at least one, and sometimes several of the following: computer programmers, instructional designers, videographers, graphic artists, behavioral psychologists, educational researchers, and a project manager.

The role that programmers will play is critical and may appear obvious. Notwithstanding, such individuals must demonstrate mastery-level competency in object oriented languages (e.g., *C++, Visual BASIC*, etc.), as well as multimedia authoring environments (e.g., *Authorware, Toolbook,* and *Director*), and three-dimensional animation programs (e.g., *3-D Studio*).

Videographers and graphic artists bring the visual expertise required to guide the selection and/or creation of images used to realistically (or abstractly) represent human behavior. Varying degrees of image realism must be generated in order to make comparisons, etc. aimed at arriving at optimal fidelity levels.

Instructional designers assess needs, design instructional components, propose effective strategies for delivering instruction, and evaluate outcomes of the instruction. The psychologists assists in the quantification of human behavior -- namely, teaching and/or learning. Educational researchers participate in the identification, collection and analysis of data used to create the knowledge base component of the simulation. The project manager serves multiple roles while assuming primary responsibility for scheduling, identifying additional resources, and the like.

Information Resources. A number of electronic databases will be evaluated and utilized to generate the knowledge base for the simulation. Several CDROMs of this type exist and are currently available (e.g., *National Longitudinal Study 1988, Education Statistics*, and the like). Several previous investigations employing older technology will be reviewed to compare methodology, analysis and research findings (Strang, et al., 1991; Strang, et al., 1989; Strang & Booker, 1984; Strang & Booker, 1983).

Developmental Tools. Newer technologies and software products will continuously be reviewed for their capability to provide a programming environment robust enough to complete the project in a timely manner. Where necessary, several products will be combined to achieve results. Hardware is currently limited either to a Pentium-based environment or UNIX workstation. It should be noted that hardware selection is based largely upon availability and current performance ratings and is subject to change at any time.

Time Line. The feasibility of such an undertaking will be evaluated periodically and regularly. As a part of the formative evaluation process, decisions will be made to either proceed with the project as originally planned, alter the current course of action, or abandon the project altogether. Weekly meetings are planned with all participants providing progress reports on any new developments which might benefit their own immediate needs or the team as a whole. If the "green light" to proceed is retained, the team will develop a rapid prototype of the simulation, conduct a pilot test of its functionality, and then move quickly to seek additional funding for expansion of the model.

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Design Issues Adapting a Visual Paper-and-Pencil Test to the Computer: A Case Study — The Figure Classification Test

By James M. Washington Jr.

Abstract

This paper documents some issues in a project assignment to convert the Figure Classification Test to the computer. The intent is to illuminate these issues, and to outline major questions. A brief description of the original paper-and-pencil test is followed by a description of the project's computer program, revealing part of the decision-making process that went into this implementation. Results from observation of initial users of the program are followed by some concluding thoughts. Although an initial philosophy of "faithfulness to the original test" produced an ultimately workable test project, observation of persons taking the computer-based test revealed opportunities for improvement.

Introduction

As effort in the field of teaching continues to move toward computerization, the idea of testing on the same platform follows predictably. Not only do we want to pre- and post-test the students to determine teaching effectiveness, but we may also be interested in some characteristics of the learners so that our methods may be better tailored to different learning styles.

The Paper-and-Pencil Test

The Figure Classification Test is a standard test published by the Educational Testing Service in Princeton, New Jersey (Copyright © 1962 by Educational Testing Service. All rights reserved.) The test's purpose is to determine the subject's *ability to discover rules that explain things*. The test is almost entirely visual, except for some initial textual instructions to the test subject and familiar control text like STOP. DO NOT GO ON TO THE NEXT PAGE UNTIL ASKED TO DO SO.

The methodology of the pencil and paper test is as follows:

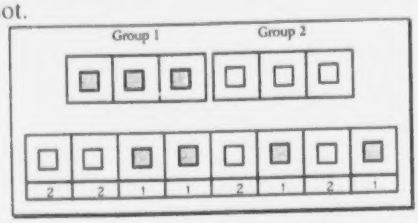
The subject sees a series of two or three groups of pictures. Each group consists of three pictures, with each picture composed of printed shapes. The pictures are grouped according to some rule, such as "the shapes in Group 1 have gray shading, and, in Group 2, the shapes do not have gray shading," as illustrated in Figure 1. The subject is asked to classify each of the eight figures under the groups as belonging to one of the groups by writing a 1, 2, or 3 under the figure.

Figure 1 is admittedly a rather degenerate example. In the main body of the test, the test subject needs to make associations on visual and geometric concepts like right angles, parallelness, apparent dimensionality, relative spatial positioning, and so forth.

The Figure Classification Test was considered for computerization as part of a larger project. Abbot L. Packard, also a graduate student at Virginia Tech, was currently preparing a computer assisted tutorial / refresher on statistics for use by graduate students. As part of the project, he was interested in what learner characteristics make statistics more or less accessible. Since statistics may be considered a visual / spatial / rules course of study, a participant's score on the Figure Classification Test is interesting in this respect. Since the statistics tutorial is computer-based, it is desirable also to want to perform the learner testing on the

Figure 1

Example Figure Classification Test set Group 1 has gray shading. Group 2 does not.



same platform, hence the need for computerization of this test.

The Program

The task was conceptually easy: Take a standard, published and verified test, and put it on the computer. Display the test questions, get the user's input, and calculate the score, clearly merely a programming task. Display, user interface, and other design issues were "implementation details." The obvious strategy was to be as faithful as possible to the paper-and-pencil test, taking advantage of features and compensating limitations of the computer medium.

Initial Program Specifications

- Development environment: Authorware® Professional™ for Windows™
- The test: Copyright © 1962 by Educational Testing Service
- Philosophy: maintain faithfulness to original test
- Project completion: 3 weeks

Initial assumptions:

- Target resolution:
  VGA (640x480, 16 colors)
- User inputs:
  mouse / computer keyboard

Getting the Graphics

Of immediate concern was the task of taking the original drawings and converting them for use in the project.

Scanning the test pages, then converting them to line output using a tracing package turned out to be unsatisfactory, as shown in Figures 2 and 3. Adding to this problem, some of the test's drawings use a dotted-line characteristic to distinguish a different "flavor" of line that sometimes is important to the rule for the set. Due to the relatively low resolution of the computer screen, dotted lines did not look good on the screen, and often broke up in ways that made the lines and curves much shorter. A small dotted-line circle often could not be identified as such due to this effect. Improving the resolution of the scan improved this somewhat, but also added extraneous photocopy artifacts that needed to be cleaned up using a bitmap editor.

Figure 2

Set number 5, first part, as scanned

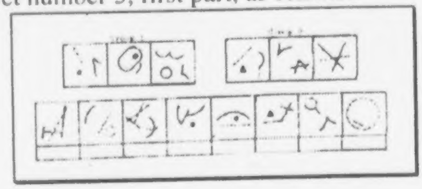
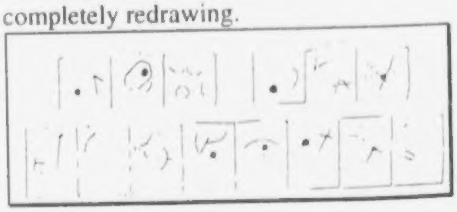


Figure 3

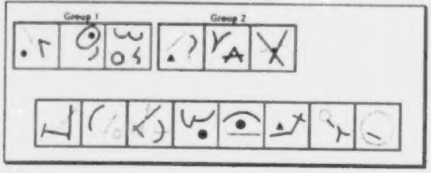
Set number 5, first part, as "traced." Cleaning up this mess took longer than completely redrawing.



Ultimately, completely redrawing the test became the easiest option, in terms of speed and quality. Dotted lines and curves became gray lines and curves. The "Layers" feature of CorelDRAW!® allowed use of a standard template for the boxes. The individual drawings were redrawn within these, as shown in Figure 4. From there, the figures could be copied-and-pasted into Authorware®.

Figure 4

Set number 5, first part as redrawn using CorelDRAW!®



The original test centers the group figures above the eight test figures. For consistency of user interface for the project, Groups 1 and 2 always remain in the same place relative to the test figures, regardless of whether a third group is present.

Since the redrawing was performed by persons knowledgeable about the rules for the particular sets, conversion of dotted lines to gray and the standard placement of the groups are the only substantive visual differences between sets in the original paper-and-pencil test and the sets in the project version.

Screen Design

The philosophy of design for the project screens was to keep close to the paper version, yet to help the user navigate the test. In the paper test, up to four test sets are displayed per page. For the project, only one set is displayed per screen, in deference to the relatively lower resolution of the computer screen.

As designed, the top of the screen displays status information, the center displays the active zone for user input, and the bottom of the screen contains navigation buttons. Feedback and instructions to the user also are important, so interactive prompting and highlighting of user selections occurs while the test is being performed. Figure 5 shows an example screen, as the user sees it before selection of a test figure, and Figure 6 shows the same screen after user selection of a figure.

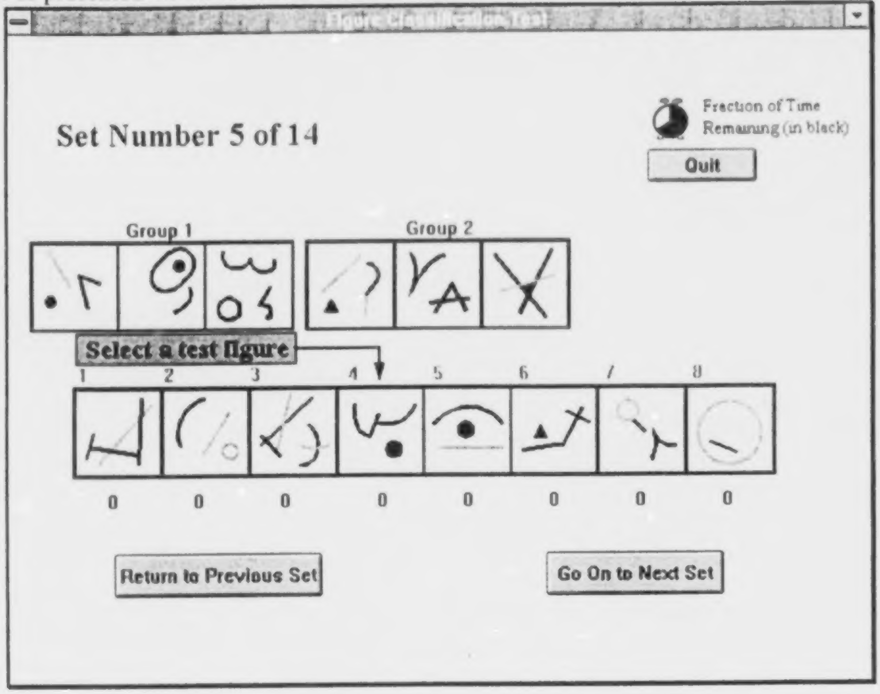
Authorware® provides easy access to user interface methods, so mouse and keyboard inputs operate equivalently for the user. To use the mouse, the user clicks anywhere within the test figure, then anywhere within the group to which the test figure belongs. To use the keyboard, the user presses the number on the keyboard associated with the test figure, then the number of the group. To move on, the mouse user clicks on the "Go On to Next Set" button, and the keyboard user presses "Enter."

Since the original test allows the subject to return to previous sets within the current test part, the project test also allows for this with a button for "Return to Previous Set."

The original test is timed, eight minutes for each of the two parts of the test. This is also handled easily by Authorware®. The clock device in the upper right corner of the screen is provided by the authoring package, though placement and usage on the screen are left for the programmer to decide.

Figure 5

A set as presented on the screen to the user



Instructions

In keeping with the philosophy of staying as close as possible to the written test, only minor changes to the instructions were made. These changes served only to make the user familiar with the interface, assuming some familiarity with computer terms like "click with the mouse" and "press the key." The original sample problems are presented in the same format as the test proper. The first sample is completed for the user, and the second sample has a "Hint" button that, when pressed, generates a display of the correct answers and the explanation of the rules for the set.

Preliminary Evaluation

Preliminary evaluation consisted of direct observation of persons using the program. Fifteen subjects at different times sat in front of a computer to run the program with no verbal instructions or coaching, while being observed by the programmer. Subjects ranged in age from 20 to 40 years old, and rated their computer familiarity in the range of "familiar" to "expert." No statistics have been generated, but these observations have led to some questions that indicate a need for further study and improvement of the current design.

User Interface

The user interface and screen design seem to be acceptable. Clicking a figure, then clicking a group seemed to work well for all subjects. The subjects saw a "video game" metaphor, which was familiar to the extent that clicking with the mouse in a region generally gives a predictable response.

The current design makes mouse usage mandatory and keyboard input optional. A mouse click is mandatory on the buttons that say "Go On to Next Part," a design feature that prevents those who use the keyboard from blindly pressing "Enter" after the last set of a part, removing their opportunity to review or complete previous responses. Mouse use is also mandatory for the button to "Return to Previous Set," for no apparent reason, however, no user has yet asked for a keystroke to do this.

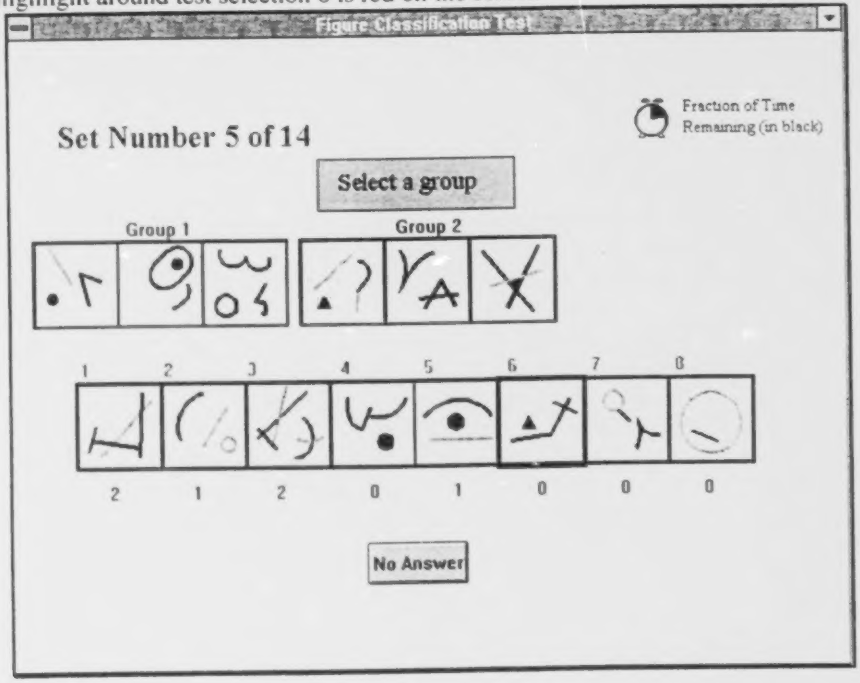
It may be a general rule that if mouse use is mandatory in any respect, users will not tend to use the keyboard. No subject, after moving the mouse, ever attempted to use the keyboard for input. When asked why they used the mouse in preference to the keyboard, most subjects said it was just preferred. It is noted that more mental effort is needed to code the test figure locations to the numbers 1 through 8 and the group locations to the numbers 1 through 3 than moving the mouse cursor to those locations.

Users did not all gain immediate proficiency at the task, however. The instructions provided in the test may be insufficient. A few subjects, even after the second sample problem, still stated that they did not understand what they were supposed to do. All of the subjects who were ignored on this issue (and it was difficult not to answer questions) eventually did figure out the task. It appears, particularly with computer-based testing, where no assumption can be made about the availability of a person to answer questions, that instructions must be abundantly clear. This is not just a different test; it is a new computer program that must be learned.

Placement of the "Quit" button was problematic. Originally, it was placed with the navigation keys at the bottom of the screen, but users often pressed it instead of the "Go On to Next Set" button. These users reported that they knew what the button was before they pressed it, but pressed it anyway. These

Figure 6

Screen after selection of test.
The highlight around test selection 6 is red on the screen



151 BEST COPY AVAILABLE

users had just completed using another package with the "Go On" button in the same place as the "Quit" button in this application. Navigation and exit keys should be spaced apart from one another, and should, if possible, be consistent between applications.

Device Dependence

For a program developed in Authorware®, the project is surprisingly device-dependent. Of particular concern is the difference in contrast between monitors. Gray shading can turn black or disappear completely depending on the position of a knob on the user's monitor. Since the difference between black, white, and gray is essential to the test, would another color be better than the gray?

Another device-dependence question is the issue of screen curvature. Is there a limit on the curvature of a computer monitor at which parallel lines and right angles no longer appear to be parallel lines and right angles?

Still another portability question is the speed of the computer with respect to screen updates. The project uses the times allowed from the original test, and does not allow extra time for updating the screen between sets. Moving from one screen to another on a 486/33 machine takes approximately one second. Screen updates using a faster or slower machine with a different video card would necessarily take a different amount of time. Is this important to the validity of the test?

Test Factors

Some users appeared to be more proficient than others at using the mouse and keyboard. Is this important to the user's score on the test?

The test is presented linearly, with one set following another set in the original order. Is this ordering important? How was the original order determined? Some sets do appear to be more difficult than others, since the users seem to spend more time on some sets than others. Does the computer screen presentation change factors that affected the original ordering?

Most users worked the test linearly and were hesitant to move on to the next set if they had trouble. Thus, it appears that the project also tests a subject's willingness to give up and move on. Is this effect enhanced by this particular presentation mode? Was this part of the original design? Would clearer instructions help? Would presentation of a "difficulty index" help?

The project provides instant scoring to the user. After the test, most users asked what the score meant. Since this is a test that can be taken only once due to learning factors, would it be appropriate to give the user some idea of the significance of the user's score compared with others? How significant is the score? Should high school students be grouped with college students? Should engineering / technical persons be grouped with education / social sciences persons?

Testing Conclusions

The project presents a substantially different test than the original paper-and-pencil test. It tests not only the subject's *ability to discover rules that explain things*, but other factors, like willingness to learn a new computer program, mouse / keyboard skills, and propensity to give up and move on. Device dependence issues also detract from the computer test's equivalence to the original test. To its credit, however, it presents a substantially level playing field to the user. Persons with more difficulty *discovering rules that explain things* spent more time on the initial sets and had lower scores than persons with less difficulty. None of the observed subjects completed all sets, indicating that the current time limit is a limiting factor to the higher scores. It seems likely that the current configuration of the project will significantly differentiate between persons with high ability and low ability in the test's design purpose, although the scores will not likely be comparable to the original test's scores.

Conclusions

There is more than meets the eye in adapting a visual test to the computer. An attempt at faithfulness to the original paper-and-pencil test may not be sufficient to make the subject's score the same from paper to computer. The author's experience in this regard is not unique. Review of publications on the subject of computer-based testing indicates that even text-based psychological tests on the computer may show different results than the paper-and-pencil versions. Themes in these papers include computer anxiety (can this be distinguished from anxiety in learning a new computer program?), the primacy of the importance of the user interface, computer response time, programming errors, and miscommunication between the test preparer and the programmer.

It is perhaps an overstatement that computer-based tests are a new frontier in testing. Computer-based tests have been around since the advent of computers. Recall that almost everyone's second programming task involves quizzing the user for his name. Research into quality and design issues related to computer-based testing, however, has only taken place in the last fifteen years or so.

Direct observation of the users of the program appears to be a good first step toward improving and validating this computer-based test. More work will be necessary to make the project comparable to the original test, if that is a desirable characteristic for the project. Among the possible strategies are:

- improved instructions, perhaps with more examples
- a better representation of "flavor" than gray
- timing the responses to determine a better order for the test
- randomizing the sets (would this improve or hurt scoring?)
- establishing a time limit for comparable scores with the paper test
- replacing or redrawing sets that prove to be more difficult to the users
- shortening or breaking up the test
- accumulation of scores for persons of different backgrounds for comparison and assignment of more meaningfulness to the user's score

It is possible that a complete redesign of the test might be a desirable option. The paper-and-pencil test is limited to black ink on white paper and geometrical shapes; would additional colors or motion or more iconic clues enhance or detract from the test purpose? Could such a test be adapted to give additional information about the subject?

As the title suggests, this paper is about issues, not answers. The computer is a promising platform for testers and test-takers alike. For the user, tests can become more like video games, and the public seems to have an almost inexhaustible appetite for these, which are, after all, tests of some sort. For the tester, the computer also provides the ability to diagnose and improve a test to a degree never before possible. It is only a matter of doing so. Only after the limitations of a test are known can they be determined to be important, unimportant, worth pursuing, or worth a complete rethink of the project.

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Representing The Ghetto Playground:
From 'Be Like Mike' To *Hoop Dreams*

by Jeffrey Chown

Abstract

This paper traces representational strategies employed by the recent documentary *Hoop Dreams*. Of particular interest is the way the film employs juxtapositional editing strategies to make sociological observations about racial relations in current American society. The paper examines how this proceeds from traditional notions about what form and meaning the genre known as documentary film can exhibit. The phenomenon of *Hoop Dreams* is also placed against the broader cultural context of popular culture representations of class and race, and finally how mass audiences receive such works.

The problem with documentary as a form is that it invites loosely warranted claims of "truth," "objectivity," and "realism." It seems to have a different status than fictional films, which are more closely associated with "fantasy," "entertainment," and "contrivance." In the realm of the movie theater, the audience seems to prefer the latter descriptors to the former when deciding upon what to spend six or seven dollars. Documentary is normally confined to the province of the classroom, PBS, or the Discovery Channel. However, when a phenomenon comes along such as the film *Hoop Dreams*, which breaks box office records for the documentary form and fans a public outrage over its exclusion from the most contrived of Americana, the Academy Awards, then it is time to reexamine our coordinates.

The title alone should cause us to be wary; how does one visually document "dreams," a mental construct which can be explained orally, but becomes more difficult in a medium of the visual? The ultimate irony of this documentary is the confusion of whose dreams the film documents—Arthur Gates and William Agee's? Or are they merely stand-ins for the dreams of thousands of young, inner city basketball players? Or, and this will be the subject of this paper, are the dreams in question those of the audience who invests in the play of light and shadows that represents the film before them? Is it a white fantasy about the Other that *Hoop Dreams* serves up?[1]

Hoop Dreams emerges at a strange time in the history of American race relations. More black people than at any time since the Emancipation Proclamation are currently incarcerated. Affirmative Action is on the retreat and progressive social welfare programs to aid the poor are being systematically dismantled. The O. J. Simpson verdict has become a touchstone for a white backlash to black hostility towards the criminal justice system. And yet if we are an insensitive, racist culture, why is it that our televisions and movie screens have never been so open to positive black role models from the Cosbys to "Be Like Mike" to Colin Powell to Hollywood luminaries such as Danny Glover, Denzel Washington, Whoopi Goldberg, or Oprah Winfrey? At the same time, negative role models also abound. Rap artists using profanity and anti-social messages to denounce the racism of the white power structure are made millionaires by white teenagers flocking to buy the latest N.W.A. or Dr. Dre CD.

These contrasts may be paradoxical and incongruous. Or we may need to consider whether even positive images of black people in the mainstream, dominant media in some way either contribute to or mask a systematic suppression of a race of people in America. To state the case in a more inflammatory way, are we moving to the socio-demographic point where if blacks can not follow the comfortable example of the Huxtables, America will write them off to crack houses and prisons? The concern in the following is with how documentary images of black America interface with these cultural developments.

On the surface, *Hoop Dreams* should be the antidote to white (and black) fantasy television such as "The Cosby Show" or "Fresh Prince of Bel Air," which depict a world of black affluence with little correspondence to demographic reality. In *Hoop Dreams*, one black family is depicted in the desperate background of the Cabrini Green housing projects and the other in the rowhouses of Chicago's west side. Electricity is turned off because the Agee family, living on welfare, can not come up with the bill. The father struggles with a crack addiction and turns to religion. The other boy's father deserted him at birth. His older brother is frequently unemployed and vicariously lives through his younger brother's successes. At the beginning of the film, the two fourteen-year-olds have fourth to fifth grade reading levels. *Hoop Dreams* seems to depict a level of desperation not normally encountered in American mainstream media's representation of black life, unless it is to set up a violent gangster rap story about drugs in the inner city.

But we should stand back for a moment. *Hoop Dreams* has an extraordinary propensity for escalating the level of abstraction about what its documentary images "mean." Two black teenagers and their families consented to have three white filmmakers follow them around in their day-to-day life for a period of five years. The images the filmmakers have collected and edited provoke David Denby to write: "Whatever else it is, the movie is a portrait of a wounded culture that, at the moment, can imagine very few ways to bind and heal itself."[2] How is it that video of two fourteen year olds who love basketball eventually becomes a "portrait of a wounded culture"?

The question is slightly facetious. Any documentary is only as interesting as it inspires our ability to move from the concrete to the abstract and to, as David Bordwell puts it, "make meaning."[3] Even a Discovery channel documentary about Rain Forest butterflies involves an inevitable level of abstraction or anthropomorphism as the viewer makes sense of the images before him or her. *Hoop Dreams* is only compelling if the documentary images of two black basketball players represent more than the two players involved, if we can make the next move and say these images mean something about our culture, our attitudes about race, our social organization. If the film does not invite this move, then we are simply using it to eavesdrop voyeuristically on two individuals exotic in their difference for us.

So I do not find Denby's assertion that *Hoop Dreams* portrays a "wounded culture" to be unreasonable; it just needs to be tested against other interpretations.[4] It would seem, however, that the most salient question about possible interpretations of *Hoop Dreams* is whether this film gives us positive and useful insight into racial questions, into questions concerning sport and society, or whether the film opportunistically capitalizes on current public fascination with black athletes. This same fascination makes a few fortunate individuals very wealthy, but it potentially reduces the range of career options conceivable for black males to sports and entertainment and not much else.

Sometime in the Eighties, basketball emerged as the preeminent media/marketing sport in American culture. With its fast, continuous action it is a more telegenic sport than baseball. With bare heads and legs, in effect visible bodies, it is a more human sport than football which features heavily padded and protected players who are difficult to distinguish in a long shot. Basketball stars such as Michael Jordan or Magic Johnson have reaped the benefits of the growing public fascination with the game with outrageous commercial endorsement contracts, something on the order of $40 million per year for Jordan.

With the basketball fever which has made "slam dunk" part of the national vocabulary, has come an interest in the spawning ground for the mythic stars of the NBA who are predominantly black. This is of course the ghetto playground, which of late has become a primal fantasy land for white America. Pepsi, Mountain Dew, Nike, Reebok and a host of other corporations have begun developing ghetto playgrounds as prime repositories for seductive fantasies about their products. We see Shaquile O'Neal arguing with a cute ten-year old about drinking a pepsi at the neighborhood asphalt court. Or we see Charles Barkley and Michael Jordan chase Bugs Bunny around another urban court. (Note the spots with Jordan and Larry Bird are shot instead in an arena—Bird is associated with rural Indiana basketball and would seem incongruous in an urban setting.) Perhaps the biggest fantasy commercials are the ones where we see ethnically balanced teams playing, with white male models with GQ looks interspersed with black and latino players—as if the ghetto playground were a true melting pot experience.

Most amateur pick-up game players will tell you that playing outdoor basketball does have a way of leveling racial and class distinctions. Blacks and whites co-exist far more harmoniously on the basketball court than in other arenas of life. The rules of the playground game are easier to understand than the etiquette of societal interaction between the races, and weekend warriors can generally count an array of racial types as friends. However, the particular playground that Arthur Agee, William Gates, and countless black players before them compete on day in day out is for all intents and purposes a segregated, ghetto playground. It is a place that white players fantasize about being admitted to—a wild, dangerous place, where incredible ball is played—but they dare not enter this arena unless chaperoned. The film *White Men Can't Jump* plays with the transgressive notion of a white man entering this world; the fictional film's fantasy project is best revealed when Woody Harrelson, through the magic of camera angles, does seemingly dunk the ball on an inner city playground. However, *White Men Can't Jump* has more reality than the sanitized version of inner city life and athletic activities we see in television commercials. Pepsi would never have you believe that drive-by shootings can happen, drugs can be scored, and people are working out intense frustrations in their play on the asphalt court.

There is, then, a bit of the touristic gaze about *Hoop Dreams*. White America can enter a hallowed but dangerous ground through this movie, just as white sophisticates once braved the strange land of Harlem to travel to see black entertainment at the Cotton Club. The first signal of this is a slow motion shot of 14-year old William soaring through the air to dunk the ball on a netless rim. The lack of a net gives this particular dunk an ascetic quality—no frills, we are not in the suburbs, these are mean streets. The slow motion and the repetition of the shot are the filmmaker's stylistic signature. They know this single act is the essence of the film, the dream that starts on an inferior court and somehow ends at Marquette University's state of the art arena with thousands cheering and lucrative pro contracts in the wings.

Though *Hoop Dreams* is certainly a documentary, its success turns on a Horatio Alger narrative worthy of any Hollywood film. It tracks the lives of its two subjects from an eighth grade tryout for high school basketball powerhouse St. Joe's up to their entrance in college—William at Marquette, Arthur at the Mineral Area Junior College in Missouri. The five year time span is crucial to the film's success. Had the film traced only the first two years through their sophomore season, it would have ended with William's dreams derailed by an injury and Arthur shuffled off to a lesser high school because his parents could not afford the tuition. Such an ending would have provided a strong indictment of the system that used the boys and gave them little in return except heart ache. However, American society does not really want to hear that version of the story anymore than it wants to hear that Michael Jordan is an arrogant, self-involved prima donna with a gambling addiction.

So the narrative stays with the boys for another three years and more drama unfolds. William rehabilitates his knee but comes up short of his dream of winning a state championship. Arthur, at the also ran, predominantly black high school, unexpectedly gets involved with a cinderella team that goes to the state semi-finals after beating the previous year's best team in the nation. Again, it would seem that such a turn of events would provide an appropriately dramatic finish. Now, however, the film would be unduly optimistic—Arthur's team vindicating the dreams of the previous four years and possibly supplying an argument for black players staying away from the wealthy, white high schools that recruit black stars.[5]

But another twist occurs. Although William is bitter about his St. Joe's experience, there seems little question that it is the advantages of a superior high school and an Encyclopedia Britannica training course which they have arranged for him that helps him to get a 17 on his ACT and to enroll at Marquette. Arthur, on the other hand, can not get the 17, barely finishes high school, and enrolls in an obscure junior college, where six of the seven black students at the school are on the basketball team. The film leaves us there, William seems bitter, but he assures us that he has learned that he can have a life without basketball and be happy. Arthur seems to cling to the dream although a stranger in a strange land. Neither player seems now destined for the NBA, but they both seem to have more maturity and wisdom; we sense that they can survive without basketball. The bittersweet quality of the ending is further developed by the revelation that both boys have become unwed fathers. This should remind the more reflective viewer that there are limits to how well we know these two people through the medium of cinema verite documentary.[6]

While the film suggests that the environment the boys grow up in is a dangerous one—Arthur's mother says it is an accomplishment to live to the age of 18—our view of their interaction with ghetto life is circumscribed. Off-screen, Arthur is held up by a crack-head, which becomes the final straw in his deciding to sign with the junior college. Off-screen Arthur's father beats his mother, leaves the family, serves jail time. Off-screen Arthur's best friend, Shannon, succumbs to a life of drugs and crime. These are events we are only privy to through the voice-of-God, off-screen narration performed by the film's director, Steve James. A different stylistic choice would have been letting Agee and Gates narrate the film—they are both communications majors after all. However, in the final analysis we see the lives of Gates and Agee through a white filmmaker's lens, and perhaps it is thus more appropriate that the narration reflect that positioning.

The filmmakers have admitted to being completely surprised at finding out Gates had a three-month old daughter. That there are limits to how well we can know a subject when three hours of film time represents five years of two people's lives should not surprise us.[7] However, this seemed to escape a *Chicago Tribune* reviewer who wrote enthusiastically: "*Hoop Dreams* digs far below the surface...showing us everything—the games, practices, home life, friendships, the good times and bad times..."[8] I might modify his word choice from "shows us everything" to "shows us everything the filmmakers want us to see," although even that statement is complicated by the fact that there certainly must have been a bit of negotiations between filmmaker and subjects over when and when not to turn on the camera.

The camera reality that finally is on display is filtered through the biases of the filmmakers. That there is an quasi-ethnographic concern on the part of the white filmmakers travelling to Cabrini Green and the Chicago west side is best demonstrated in some of the editing choices. (Editing, of course, was what produced the film's lone academy award nomination.) In particular, montage juxtapositional editing, or "collision" editing in Eisenstein's terminology, is used in sections dealing with the state championship tournament. Agee is competing for the black, inner city high school, Marshall, coached by Luther Bedford. Gates plays for the majority white, Catholic, well-funded high school, St. Joseph's, coached by Gene Pingatore. The most vivid juxtaposition cuts the two respective bus trips together. Pingatore in a somber, funeral like atmosphere admonishes the boys to think quietly about the upcoming game. Bedford's bus, on the other hand, is raucous, party-like, and the boys boisterously brag about how they will beat their opponents. To many viewers, there must be satisfaction in the fact that it is Bedford's basketball-is-fun attitude that prevails in the tournament and not Pingatore's win-at-all-costs.

The filmmakers make other interesting juxtapositions: shots of crowd behavior at Marshall versus St. Joseph's. Shots of students dancing to R and B music at Marshall are cut against the more stilted pep band playing at St. Joseph's. The school atmosphere shots are also juxtaposed. In one of the better scenes, two cultures come together in a single shot. Black parents of Marshall players joke good-naturedly with white parents from an opponent at a restaurant "down-state" where the tournament is taking place. The respective parents' pride in their children seems to transcend the racial and cultural differences.

The editing also uses linkage montage to suggest similarities and parallels between Gates and Agee that are of no small interest to a sociology of the black family. The disappearance of the black father is one of the more salient aspects of the culture of poverty in black America. Throughout the film, images centering around the theme of fatherhood are paralleled between William and Arthur. William's father has been absent since he was a young child. In one scene he goes to visit the lost father's auto repair shop accompanied by the off-camera filmmakers. William is skeptical of the father's sudden interest following his basketball fame, but the presence of white cameramen must have put an additional strain on the reunion that is never commented upon. One wonders if the filmmakers directly or indirectly persuaded William to go through with the emotionally charged event.

Agee's father is a more frequent presence in the film. At one point we see him in the distance at his son's playground scoring drugs. In another memorable scene, the father and son have a one-on-one game that threatens to get ugly with emotions they respectively invest in the game. As was mentioned earlier, for a period of time Agee's father leaves the family and is in jail. He returns a born-again Christian, although a strain remains evident in the family which the filmmakers treat tactfully.

Fatherhood is also manifest in the relationship between Gates and his older brother and in Gates relationship with his illegitimate daughter. Curtis, the elder brother, tries to be a guiding figure for William, but it is clear that the filmmakers are more interested in Curtis as a casualty of basketball dreams. He was a former junior college star who is now unemployed until William's Encyclopedia Britannica patron gets Curtis a job in the packing room. His presence in William's life seems to fade as Coach Pingatore becomes more dominant. William in several scenes is seen playing with his daughter and promising that he will never desert her as he was deserted himself. It seems the filmmakers want to close on this optimistic note, and William's relationship with his daughter's mother is not explained at much length.[9]

2 The mothers of the two players are presented as the bedrock of the respective families. In an extraordinary scene, Arthur's mother gets the highest grade in her nursing class and breaks down and weeps for joy. By

this point the audience for the film is firmly in her corner. When Arthur turns 18 she loses her ADC support for him and the filmmakers tape her complaining about the difficulties this presents to their survival. Even in an age of Republican slashing of the Welfare system, I think most of the film's audience are sympathetic to her complaints.

Hoop Dreams opens up two black families to our inspection for three hours. Some critics have complained that what American society really needs is a film about black kids struggling to attain careers in teaching or medicine. This complaint, however, points directly to the problematic status of documentary's truth claim. Documentaries purport to be about what is rather than what should be. Even had the filmmakers found two aspiring physicists in Cabrini Green high schools, would audiences for the resulting film be inclined to believe the hypothetical students stood in representationally for a larger demographic group in our culture? The fact is we know this hoop dream exists, our mass media is drenched in it and our children reconfirm it every time they lace up their Air Jordan tennis shoes.

Whether *Hoop Dreams* the film critically challenges the siren song of athletic glory that obsesses so many black children or whether the moderate success of the two protagonists only reconfirms the notion that basketball is the best way out of poverty is what is at issue. In the aftermath of the media frenzy that surrounded the film's initial success, the answer seems fairly clear. President Clinton arranged photo ops with the boys with rhetoric about how they were ideal Americans. Arthur Agee has signed on with the Continental Basketball Association. William Gates has started his own company to market himself. Both are finishing their college degrees. All that hard work on the asphalt courts paid off for these two even if they ultimately will be denied Michael Jordan status.

On the other hand, there were some more intangible results about which we can only speculate. White America got a close-up look at black poverty; maybe the film produced some empathy and understanding in a racially polarized country. One reported phenomenon was that across the country coaches at all levels were taking their teams to view the film, apparently as a motivational tool or maybe to compare themselves to Coach Pingatore. Or maybe it was to show that kids of all colors and socio income brackets share something and that is a love for playing basketball. The uses and responses to film are many. The final use will be Spike Lee's; he will produce a fictionalized version of the story.

There was nothing predictable about *Hoop Dreams*. Three baby boomer, white, independent filmmakers with very little money got an idea about making a documentary focusing on playground basketball culture. They crossed a cultural divide and befriended two families who took big risks with them. They spent five years on the project, a substantial chunk of anyone's life, and they created something quite unique—an almost three-hour long documentary that had people purchasing tickets on a Friday night in suburban malls. Its success is a testament to good filmmaking, as well as to the fact that American culture is desperate for messages that will bring races together rather than pushing them apart.

Endnotes

1. I use the term "The Other" in the sense that Bill Nichols does in *Representing Reality* (Bloomington: Indiana University Press, 1991), pp. 202-209.

2. David Denby, *New York*. (v. 27: October 24, 1994), p. 60.

3. David Bordwell, *Making Meaning* (Harvard University Press: Cambridge, 1989). Bordwell writes: "Taking meaning-making as a constructive activity leads us to a fresh model of interpreting films. The critic does not burrow into the text, probe it, get behinds its facade, dig to reveal its hidden meanings; the surface/depth metaphor does not capture the inferential process of interpretation. . . . An interpretation is built upward, as it were, gaining solidity and scale as other textual materials and appropriate supports (analogies, extrinsic evidence, theoretical doctrines) are introduced." p. 13.

4. Richard Corliss makes a similar observation to Denby's: "*Hoop Dreams* isn't mainly about sport, or even about life and death in the inner city. It's about families hanging tough on nerve and prayer. It's about what passes for the American dream to people whose daily lives are closer to nightmares." *Time* (v 144, p. 76: October 24, 1994), "Hoop Dreams."

5. When saying St. Joseph's is a white high school, I am overstating the case, just as most critical commentary on the film has. The *Chicago Tribune* reported the following statistics, which were released to them by the school: "The school's enrollment is about 20 percent African-American, 18 percent Hispanic and 2 to 3 percent Asian-American. About 87 percent of all students, and 92 percent of all basketball players, in the last five years at the school have gone on to college. . . ." Poe, J. (1994, October 6). "St Joe's calls foul on film," *Chicago Tribune* (section 2C), p. 8. The statistics on students going to college suggest a high income bracket clientele.

6. For a discussion of American cinema verite's tradition, see Richard Barsam's *Non-Fiction Film* (Bloomington: Indiana University Press, 1992), pp. 300-308.

7. About the surprise announcement of William's baby daughter, Mike Gower comments—"William has clearly set the agenda for when this part of his life should be revealed to the world." "Hoop Fantasies," *Sight and Sound* (v 74, n. 5—July 1, 1995) p. 64.

8. Michael Wilmington, "The 'Dreams' Team," *Chicago Tribune* (January 1, 1995: Section 13, p. 4).

9. Paul Arthur and Janet Cutler found the strategy of what is revealed about the two players to be obsessively focused on their basketball careers: "Do they listen to music, watch TV or so to the movies, worry about dating, talk about clothes or crime? *Hoop Dreams* either suppresses this information or treats it as ammunition for surprising plot twists." "On the Rebound: *Hoop Dreams* and Its Discontents," *Cineaste*, (v 21, n. 3—1995) p. 23. Arthur and Cutler also feel the film could be more didactic; they complain that no statistics are presented concerning black basketball player graduation rates, for instance.

Mapping The World Through Science And Art

by Lydia Dambekalns

Abstract

One of the most interesting challenges facing educators today is how to engage students in meaningful study of the environment in which they live. This paper presents the rewards of studying scientific data from an aesthetic point of view. The visual display of the earth's surface through aerial photographs and satellite map images becomes the basis for interpretive art works created with dyed silk by high school students at the Pennsylvania Governor's School for Agricultural Sciences. Included in discussion are the pedagogy and practice of visual literacy skills and interdisciplinary ties between art and science.

Introduction

For years I have noticed the beautiful images of earth generated by Geographic Information Systems (GIS) remote sensing studies They have appealed to me for a number of reasons: from an artistic standpoint based on their colorful designs, from a cultural standpoint derived from the complexity they show of our life on earth, and from a scientific standpoint as an interesting source of data on world ecology. As an artist, I wondered how I might use them in my own studio work, and as an educator I began to think of opportunities to introduce students to these images.

In 1995, I saw an exhibit of work by Mary Edna Fraser in Washington, DC at the Smithsonian's National Air and Space Museum. An amazing array of huge banners hung from the ceiling in one large gallery depicting Fraser's artistic interpretations of land forms based on her piloted flights over the East Coast. These large maps of waterways, ridge and valley provinces, and coastal areas were inspired by aerial photographs taken by Fraser herself combined with remote sensing images from areas she could not reach. One of the most exciting aspects of the exhibit was its existence as an aesthetic representation of artistic endeavor in the midst of a traditionally science-oriented museum. Thus, directly in the public's gaze was an example of interdisciplinary connection between science and art. My own background as a fiber artist helped me to see the potential of using these map images on a smaller scale, possibly in an educational setting. But where?

The opportunity to work with maps in an artistic venue came my way a year later when I became associated with the Pennsylvania Governor's School for Agricultural Sciences (PGSAS) located on the campus of Penn State University. Every summer sixty-four outstanding high school scholars are selected for six intensive weeks of primarily science oriented curricula. However, the director of the program was particularly interested in presenting these students with a full compendium of challenging experiences. Part of that involved using visual/spatial intelligence (Gardner, 1993). As such, I developed an elective offering for those students based on using GIS and map imagery to create aesthetic representations of the earth.

The pedagogy behind the artistic production of these images is particularly interesting. In this paper, the PGSAS classroom example serves as one model of possible application. Unfortunately, due to lack of color reproduction in this publication, images of the final art pieces created are not shown. However, the problem set before the artist is discussed along with the background rationale for visual challenges and how the resulting works emerged. Although the technical procedures for working with the dye and cloth were important in this experience, it is not the focus here since concepts relating to visual literacy take precedence in this instance.

Background and Rationale

Despite efforts by some to separate the two, art and science may present similar challenges for study. Science attempts to solve problems and explain events in the universe as a way to reveal and/or gain knowledge about the physical world. While art may also be used to investigate the physical world, it also serves to express an individual's thoughts and feelings about the world and one's own reality. In other words, art may be partially defined as an aesthetic representation of an individual's view of the universe. In either case, both the scientist and artist rely on keen observation skills and an ability to work creatively. This notion underpins how a person looks at data and interprets that into understandable form. For the scientist/geographer this means mapping the earth's surface. For the artist in this case it means celebrating the diversity of our planet through visual depiction of the earth's characteristics.

Rudolph Arnheim, Professor Emeritus of the Psychology of Art at Harvard wrote in *Visual Thinking* (1969) that

> [it would be misleading to] pretend that in science the senses serve only to record data in the manner of a photographic camera and that the processing of the data is left to later and perhaps non-sensory operations. We find instead that direct observation, far from being a mere ragpicker, is an exploration by the form-seeking and form-imposing mind, which needs to understand but cannot unless it casts what it sees into manageable models." (Arnheim, 1969. p. 278)

Arnheim continues by explaining that central to understanding the shape of existence in both art and science is "an unselfish dedication to what is. Neither of them can tolerate capricious subjectivity because both are subject to their criteria of truth" (p. 300). In our post-modern era of constructivist thought we might tend to challenge Arnheim on the use of "truth" here. Nonetheless, the point stands that both science and art require disciplined inquiry and possess an order to that inquiry. And in the case of studying map data, how might this be used to form a visual problem for the artist to solve? Arnheim's attempt to dispel the dichotomy between perceiving and thinking serves as a basis for combining sensory information with theoretical ideas. The provision of a "unitary cognitive process" can lead the learner to analysis or abstraction of the visual image (Arnheim, 1969). And so to communicate this to the students/artists.

Statement of the Problem

In the particular case of the PGSAS students, I was faced with a primarily science-oriented population who held varying degrees of confidence in their artistic capabilities. The immediate problem was simple enough: how to use data gathered through GIS images as a launch for interpretive visual images of place, be it local or global. Beyond that, students' final pieces would have to exhibit consideration of a number of visual challenges including perspective, scale, attention to hue and value, emphasis, abstraction, simplification and layering. To make this clearer for the students, I consolidated these concerns under three larger umbrellas: a) use of color, b) design (composition) and c) approach (meaning). These would be our criteria in evaluating the final pieces.

Application/Approach

Any complex visual problem involves the synthesis of a number of components. For the PGSAS students this meant combining basic knowledge, technical skills, and unique perspectives to create their art works. First, students needed to have some comprehension of how the original images were created. The two main categories for most of these maps were divided into use of digital images versus a photographic film system. The earth's surface may be recorded through infrared photography, through "false color" images, or through more naturalistic hues (as the unaided eye might see). The selection of a mode by geographers and scientists depends upon the purpose of the data collection, whether for urban planning, environmental monitoring, national defense, agricultural land use, or weather patterns (Smithsonian, 1992).

As a group, the PGSAS students visited the GIS labs at Penn State where map specialists explained how GIS information is applied in agricultural studies. From the collected images of the earth, a variety of maps in diverse pictoral styles present data in a clear and informative manner. Examples at Penn State included land use in the Allegheny Forest, a breeding birds atlas, non-point source pollution, population centers, soil types, livestock concentrations, groundwater patterns, and land use (cultivated, grasslands, evergreen or deciduous woods) among others.

The process of moving from digital images or photographs of the earth to a meaning-constructed map presents an interesting progression of stimuli for the artist. I wanted students to view their map interpretation experience more as a visual challenge than as an isolated activity taken out of context.

Nicholas Roukes has written two books, *Art Synectics* (1982), and *Design Synectics* (1988) that are useful in suggesting guidelines for creative dilemmas. Through analogical thinking Roukes (1988) outlines three basic "R's" in the creative process: "Referring" where the thinker poses the problem and sets the goals, "Reflecting" where ideas are incubated, paths followed, abandoned, etc. and "Reconstructing" which is the process of re-inventing or transforming. These three gerunds summarize well the process necessary to transform the map images to art work. If thoughtfully undertaken, the product becomes more metaphorical and more sophisticated as a result of such problem solving.

Generally, the most successful artistic examples are the product of studied consideration. In the case of these maps, challenges for the Governor's School students included perspective, composition, color selection and use, scale, abstraction, simplification, emphasis, layering, and discrimination, all aimed at obtaining a meaning or ordering for the final image. The limited amount of time allowed in the PGSAS schedule prevented us from going into too much depth for each of these, but as a group students discussed how these visual concepts could be used in their own works. For instance, we reviewed the color wheel for some basic principles of color theory--how vibrancy results from juxtaposing contrasting colors or how neutrals may be made from mix of complementaries.

As a group, students learned about the technical aspects of how to handle fiber reactive dyes which do not react like paint, and how to treat silk as a ground for image-making. Each student practiced color mixing on paper, prepared one sampler to learn about the interaction of dyes and silk, and sketched out their final design on a large piece of prepared silk. All students produced at least one large final image either in a square or rectangular format. Some chose to design two un-related pieces and some created two complementary pieces which acted as a diptych when displayed side by side.

The actual fabrication of the work took several days during which time students had the opportunity to interact with each other and refine their own ideas as the works progressed, a clear demonstration of Roukes' three "R's" in practice. On the final day, we held a group critique and examined how each person had chosen to solve the visual challenge I had posed. In many cases, we found problems students had created and overcome for themselves.

Results

The artistic map images in the end were stunning. Students demonstrated a wide range of solutions to each of those issues (perspective, use of color, abstraction, emphasis, etc.) discussed at the beginning. Perspectives in the final pieces ranged from a vastly distant viewpoint to flat up-close interpretations of the earth's surface. A few artists chose to tip their work to reflect the three-quarter interpretation one might find while flying over the earth in an airplane. Color use varied from monochromatic to multi-hue, from natural earthtones to electric vibrancy. Design schema incorporated a range of shapes from the exquisitely simple yet elegant to splotchy aeoemba-like amorphous complexity.

Some overall interpretations of the map data were very abstract while others literally portrayed the earth forms as the original image had shown. The aesthetics of images also varied. For example, one student created two pieces both portraying the earth from outer space. In one, the earth appeared relatively insignificant as it sat suspended in the gentle grip of two dark arms. In the other, an almost sinister-like atmosphere of half-human half-planetary faces surrounded our familiar swirling blue and green planet. Some final art pieces suggested a docile earth of meandering waterways, pastel colors, and balanced nature while others depicted Mankind's hand upon the land and how that has changed the natural scheme of things.

Conclusions

Final evaluations of the course suggested that it was a very satisfying experience. The products were powerful visual statements, but more importantly, through the process the students began to gain confidence in their ability to use data beyond a scientific literalism. They were able to make connections in the way artists and scientists think alike and how the processes differ. And for many, ran the unifying theme of wonder and reverence for the diversity of geological form and biological mass on this planet.

The focus of this project as presented in this paper involves visual literacy in art and science. However, the concept of viewing the earth in all its diversity lends itself well to an even larger interdisciplinary framework. In his book *Ecological Literacy*, David Orr writes about how our world view may encourage a sustainable lifestyle through modest use of the planet's resources. In his discussion of place and pedagogy, Orr calls for the integration of place into education and the "dialogue between a man and a place" or "the art of living well in a place" (Orr, 1992, p. 126). As educators, we can find a way to integrate the concept of valuing earth and our "place" into our curriculum by integrating knowledge from the disciplines with ethical and philosophical considerations.

The type of visual inquiry reflected in this paper and applied at the Pennsylvania Governor's School for Agricultural Sciences holds just such a potential. By integrating several disciplines and allowing students to pursue a theme related to the earth's diversity and natural resources, students gain a sense of interconnectedness between art and science, ecology and aesthetics. In summary, some of the outcomes gained through the exploration of mapping as described in this paper include 1) the development of visual literacy skills including an ability to read symbols and layer information, 2) an increase in knowledge pertaining to the origins and use of remote sensing data, and 3) continued development of an aesthetic eye in the creation of unique works of art. Hopefully, this project acts as a catalyst for further explorations into the disciplines.

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Light Skinned With Good Hair: The Role Of The Media And Christianity In The Maintenance Of Self-Hatred In African Americans

by Omowale Akintunde

Abstract

Most African Americans deny or are at least unaware on a conscious level of the impact of the media and Christianity on the formulation of their self-image. The phrase "light-skinned with good hair" is still commonplace within the African American vernacular. What is particularly remarkable about this reality is the lack of recognition of this cultural phenomenon as indication of a deep, subliminally anchored self-hatred. This paper explores how feelings of self-hatred in African Americans are perpetuated through media and the standard physical and ideological manifestations of Christianity.

Light-Skin, Good Hair: What's The Media Got To Do With It

There has been little attention paid to the politics of hair texture and skin color within the context of the African-American Experience. Most African Americans deny or are at least unaware on a conscious level of the impact of their perceptions of these phenomena on the formulation of their self-image. The phrase "light-skinned with good hair" is still commonplace within the African American vernacular. What is particularly remarkable about this reality is the lack of recognition of this cultural phenomenon as indication of a deep, subliminally anchored self-hatred.

This, however, is not to lay blame on African Americans. These perceptions are born out of the oppressive state in which African Americans are forced to live and as with any society based on an oppressor-oppressed relationship, the oppressed are not to be blamed for their own oppression. The self-hatred as expressed through African Americans' obsession and affirmation of "light skin" and "*good* hair" is a reaction to racism. Thus, this and similar conditions are best characterized as "racist-reactionist phenomena." These phenomena though directly resultant from overt racism are now perpetuated through other conduits such as the media.

Given the preponderance of media images and racist dogma that continually portray the skin and hair of African Americans as ugly and unattractive, it is no wonder that African Americans have such a low perception of themselves. On the surface, the import of such a basic acceptance of a group of people is not evident--not even to themselves. Because the natural hair and darker complexions of African Americans are in and of themselves considered unattractive, the resultant psychology and social attitude are that *being an African American is unattractive*. Conversely, since light skin and straight hair are considered in and of themselves attractive attributes, the resultant psychology and social attitude is that *being white is attractive*.

The consequences of such pervasive beliefs erects a terrifying social, psychological, and cultural construct which leads African Americans to believe that they are inferior by virtue of their birth status and European Americans to falsely believe that they are superior by virtue of theirs. These feelings, constructs, and social interactions are not always conscious and deliberate. In most all instances they are so deeply entrenched in the very fibers of our psyches that it is impossible to be aware of when and how these inclinations manifest themselves. A few minutes of video-watching on BET (Black Entertainment Television) will clearly demonstrate what I mean.

Here, one may view hour after hour of self-hatred conditioning. Light-complexioned African American women with long (often synthetic) hair writhe suggestively in scant attire. These light-skinned, long hair "beauties" are often depicted as objects of desire for African American men, while the African American men themselves are often depicted as the embodiment of White sexual fantasy: black, bald, muscle-bound, and virile. While this depiction appears the antithesis of the light-skinned with good hair syndrome, it is not. In depicting only light skinned, long-haired African American women as desirable to African American men, these attributes are reaffirmed. To apply the concept of light-skin with good hair as attractive attributes of African American men as the norm is contrary to the historical image of African American men as brainless, animal-like, studs whose ultimate desire is the acquisition and deflowering of the White female for whom these attributes are the norm.

This concept of the "black buck" whose sole life endeavor is "having a white woman" has been a popular visual media image since the inception of the form. D.W. Griffith's "Birth of a Nation," one of America's earliest film productions, clearly illustrates this cultural view. In one segment of this film, a white woman is pursued relentlessly by an African American male (actually played by a white actor in "black face"). As the woman runs desperately through a forest, she finds herself at a cliff. Her pursuer approaching her from the rear, she is faced with a horrible dilemma: stand there at the edge of the cliff and await the "dehumanization" of being "taken" by the African American male or jump off the cliff. Of course, given the "catch-22" of such a situation she decides death is preferable.

Contemporary Rhythm and Blues and Rap videos are merely a variation upon these themes. Since African American men engaging in romantic liaisons with white women is still taboo in the film world, the next best thing will have to do: He pursues the African American woman who appears white. Video after video reinforces this notion. An excellent example is the Melvin Riley video "Whose is It?" In this video, a shirtless, bald, black, Melvin Riley asks a very light complexioned woman with long hair over and over "whose is it?" We can see variations of this same theme with other noted African American male performers. The Bill Cosby Show is also a prime example of this phenomenon. In this situation comedy, Bill Cosby, a dark African American male is married to a light skinned woman with long, straight hair. All of the daughters have these same attributes. However, the other black male in the family, the son, is dark like the father.

Of course African American men and women both suffer tremendously from such images but perhaps the African American female suffers even more. For in addition to being portrayed as being beautiful only when she is light complexioned with long hair she is also made to suffer the woes of sexism. In such videos she is reduced not only to being a facsimile of herself but also a sexual object. Given the preponderance of such images and accepted attitudes about ourselves, it is a wonder that African Americans prosper at all. One may only say that the fact that African Americans are surviving is an undeniable indication of their tenacity.

More important than the fact of media depiction of African Americans as desiring to be Europeans, is the horrible side effects of such an inclination. Most African American women will straighten their hair their entire lives without ever allowing it to revert to back to its natural state. Hair in the natural state is considered "nappy" and most undesirable. Contrast this to the social perception of white women whose hair is considered beautiful in its natural state which is straight. It then becomes clear why African American women spend millions of dollars each year on products to make them look like white women naturally. One can easily see how such thinly-veiled self hatred can only yield devastating results. In rejecting that which is natural to you is to reject one's self. There is a subliminal message here: You are naturally ugly.

Contrast this with the psyche of white women. White women may wake up in the morning knowing that their hair is beautiful as it is. The hair need only be styled--not "fixed." Add to that the fact that millions of African American women spend millions of dollars a year to have hair that looks like yours. There is a subliminal message here, too: You are naturally beautiful. There is no way that persons engaged in such a syndrome can be considered of healthy mind. For such a syndrome sets up a negative self-image for the African American woman and a false sense of self for the European American woman.

The Clark Doll Study is clear illustration that the syndrome of self-hatred in African American women starts at an early age. In this study of four-year old African American girls, the researchers found that there was a clear majority preference for white dolls. One only need look in a classroom of African American elementary children to see this phenomenon in effect. If one were to do so, you would see young pre-teen girls with straightened hair and even hair additions. How can we expect healthy adult psyches to result when at a such an early age it is being communicated to you that you are naturally ugly. This is further important in that it illustrates how African Americans are contributing to their own self-hatred which is a necessary component of oppression.

The African American male contributes equally to this phenomenon in that such attributes in African American women are his expectation. One student that I worked with at the University of Missouri, who himself is very dark complexioned, defended his attraction to only white or light complexioned women in that he wanted to have "pretty" babies. The media unequivocally supports such notions. In addition to ads for products that straighten the hair for adult African American females such as "Bone Strait" and "Dark and Lovely" are ads pushing hair-straightening products targeted directly at African American children. One such product is "Just for You." In one ad for this product, a young African American girl is pictured with an adult African American woman, both with long, straight hair. They are both smiling, obviously proud of the fact that their "nappy" hair is now straight. The young girl in this ad is smiling very broadly seemingly especially content that there is a hair straightening product "just for her."

Ironically, such ads are quite prominent in African American publications and during television shows that are targeted to the African American population. Since Madam C. J. Walker, who became the first African American woman millionaire with the invention of the straightening comb, there have been many other African American companies and entrepreneurs who have made quite lucrative livings selling such products of self-hatred to themselves.

Because African Americans harbor such a deep resentment of themselves and because this self-hatred is so deeply enmeshed within the very fabric of their consciousness, they unknowingly perpetuate the very conditions which oppress them. It is my contention that because of this deeply entrenched self-hatred that the liberation of African Americans is not eminent because in order for a people to attain liberation they must first feel worthy of such liberation. In short, you must first love yourself. We must ask ourselves why it is that for most African Americans Robin Givens is beautiful and Whoopi Goldberg is not. We must seek to understand how the light-skinned, good hair syndrome causes African Americans to disenfranchise other African Americans and dissipates the unity that is necessary for the liberation of African peoples.

Videos are not the only medium through which self-hatred in African Americans is perpetuated. "Def Comedy Jam," a popular HBO comedy show, is a prime example. Week after week African American comedians come out and tell jokes reeking of self-hatred to a mostly African American audience who guffaw uncontrollably. The comedians often address the audience directly with quips like "Nigger you so black, for a minute I thought your seat was empty" or "Man, you so black you would leave a fingerprint on charcoal." Not only do the audience members not find these "jokes" offensive, they, too, revel in the laughter. In one episode a comedian pointed to one female African American wearing her hair naturally and quipped, "Your hair so short, I can see your thoughts!" More laughter.

Ironically, even the African American women who try desperately to live up to this African American male beauty expectation of long, straight hair fare no better. Weave and extension jokes are also par for the course. In another episode one comedian targeted an African American female in the audience with long, artificial hair and joked, "I bet ain't a horse in Central Park got a tail tonight." Thus a vicious cycle is in place here where the African American male expects the African American female to look like a white woman who in turn uses every cosmetic deception to realize this expectation and is then demeaned for the artificiality of her looks. On the other hand, the African American female who opts for her own natural beauty is also ridiculed mercilessly.

Another HBO comedy show, "Snaps!" made no attempts to be anything other than a vehicle of self-hatred. Here teams of African Americans went center stage and said the most derogatory things that they could to each other. Of course "You so black..." jokes were rampant. The person who derided the opponent best received "snaps" (scoring points) and the derided opponent was eliminated. This continued until the most despicable put-down of African Americans imaginable had been spoken and all of one team was eliminated. The remaining African Americans were declared "the winners."

Of course, capitalism plays a role here, too. Many African Americans will defend such horrid shows as the aforementioned as vehicles to stardom for African American entertainers. Here the age-old American concept that money, that is, slips of papers with pictures of former white male slave-owners, is reason enough to perpetuate your own oppression, rears its ugly head. This propensity was illustrated best during the Montgomery Bus Boycott of the 1950's. While most African Americans are pride-filled with the thought that African-Americans banned together to demand their right to equal citizenry, most are unaware of the contingents of African-Americans who had to patrol the bus stops daily often having to physically assault other African Americans to prevent them from boarding the buses. Their reason for having to board the bus: money. It seemed survival for the moment for some was more attractive than life-long liberation and the assurance of a better life for their offspring.

Because one frail woman refused to be treated as second-class citizenry, despite the economic woes it must have caused her, all African Americans have earned that right. That is short term sacrifice for long term gratification. No one seems to remember these events now. Ironically, it was a Whoopi Goldberg movie, "The Long Walk Home," which illustrates these events from the perspective I have presented. In the film she portrays a maid who got up very early in the morning to walk to work because she refused to support a system that oppressed her. Her own family was very poor while the white people for whom she worked were quite well off. At the beginning of the boycott, her boss' wife, played by Sissy Spacek, would drive her to work each morning. But even after she stopped driving her, she continued to walk.

In this instance the media provided us with a powerful message: not even money can compensate for oppression. If African Americans in that era had given in to economic pressures we would still be riding on the back of the bus. And so I ask, "Would it have been worth it to ride the bus and we still be in the same social and economic status of African Americans in the 1950's?"

Light Skin, Good Hair: What's God Got To Do With It

Feelings of self-hatred in African Americans are perpetuated and ensconced in the standard physical and ideological manifestations of Christianity. Statues of white men on crosses depicted as Christ, the "saviour" are, for example, commonplace in the African American Christian church. A great many African Americans gather frequently to kneel before such images and pray for salvation. Children are taught mythological tales in storybooks illustrated with all white characters: angels, saints, and even the mother of Christ herself.

On a superficial level the contribution of the aforementioned practices to the destruction of the African American psyche and their subjection to subsequent unrelenting oppression may not be immediately apparent. However, when one begins to understand the operative psychology behind the worship of images contrary to one's own attributes and additionally takes into account the historical oppression of African people in America based on the very Christian-Judeo doctrine from which they seek "salvation," the detriment not only should become apparent but ruefully despised for its cunning and contradiction.

One might argue that God is "colorless." That is, that he is exempt from any of the social stigmas, stereotypes, and negative social connotations that we as a society have come to regard as concomitant with human existence. But it is this very assertion that God is colorless that supports the very argument which purports itself to be the antithesis of racist dogma and oppression. If color or race were not an important consideration in the practice of Christian indoctrination why is it even important to establish God's freedom from such a system of thought or ideology? The reason is clear: Race *is* important to the acceptance of Christianity as the basis for human experience.

If religion were only an ideological practice as it is sometimes professed to be then how the image of God or Christ, the son of God, is manifested in reality would be unnecessary or at least insignificant. Thus individuals would be free to construct for themselves what the physicalization of God would be. It is also important to note that when we speak of God, we are speaking concurrently of Christ and the Holy Ghost as in Christian dogma they comprise the "Holy Trinity" and are to be considered and conceived of as one. This is important because if one were to argue that our culture offers a physical representation of Christ but not God himself, this argument must be countered with the charge that it is Christian doctrine which clearly states that God and Christ are the same.

On a another level, one might counter the argument in genetic terms. If Jesus is portrayed in our culture as a white man and the mother who gave birth (but not humanly conceived) him is also a white woman, is it really such a leap then to extrapolate from this that God himself is a white man. Of course, deeply entangled in this kind of dogma is a very sexist stance also. God of course is a man. He is God the Father. Also important is that his first born and only child is a male child. Since in Christian doctrine most often women are portrayed as despicable sexual beings who by virtue of their inherent prodigious animal-like sexuality have corrupted men and because of that sexuality have posited themselves as the very obstacle to male chastity, the conception of Christ had to be through non-sexual means. How could God himself fall for the temptations of woman who has caused the failure of mortal men. Consider the following biblical scriptures:

"And the Lord God caused a deep sleep to fall upon Adam and he slept, and he took one of his ribs and closed up the flesh instead thereof. And the rib, which the Lord God had taken from man, made woman, and brought her unto the man. And Adam said this is now bone of my bones, and flesh of my flesh, she shall be called woman, because she was taken out of man." Genesis 3:22,23

"Unto the woman he said, I will greatly multiply the sorrow and thy conception in sorrow thou shalt bring forth children, and thy desire shall be to thy husband, and he shall rule over thee. And unto Adam he said, Because thou has hardened unto the voice of thy wife, and has eaten of the tree, of which I

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commanded thee saying, Thou shalt not eat of it cursed is the ground for thy sake, in sorrow shalt thou eat all the days of thy life".

Thus according to Christian biblical doctrine not only is woman the cause of the fall of "mankind", she is robbed of her role of generator of human life. Christian dogma would have us to believe that humankind originated from the "collaboration" of two white men. No. God cannot copulate. This humanizes him and causes him to be victim to the female sexuality that has corrupted males from the beginning. This image of woman as being the species responsible for the whole notion of human suffering must remain sacrosanct. And please note that woman the species is responsible according to such dogma--not Eve the person. For to regard this as an act of an individual would be to undermine the motive in this scenario which is to paint women as a whole as evil, sexual beings who corrupt men that would otherwise be "Godly."

It has been my experience that many African Americans who are devout in their belief in Christianity, when confronted with these issues of the involvement of worshipping white male images as God, respond by saying that the physical depiction of Christ in our culture is not relevant. This is an assertion that for me transcends logic. Endemic to Christian ideology is the understanding that God created man in his own image:

"And God said, Let us make man in our own image. So God created man in his image. In the image of God created he him" Genesis 2: 26, 27

This is an issue of some importance. For again, if Christ and God are one then the physical depiction of Christ in a racist society bears heavy implications. Race matters.

These same African American Christians who claim that the depiction of Christ in society is irrelevant often attend churches where "biblical" scenes in stained church glass windows depict the events only with Europeans. The illustrations in their treasured bibles depict Christ and all of his contemporaries (even in Egypt) as being Europeans. Many have Michael Angelo's depiction of Christ prominently displayed on the walls of their homes. The April 8, 1996 cover of Life magazine was of a blonde, European male, as Christ. Black Catholics regard the pope, a white European male, as being God's liaison to common humans. Now, I say, how can you expect a people whose belief in Christianity is the anchor in their lives to escape this cycle of self-hatred, victimization, and oppression when they worship the very force that enslaves them.

Thus, in physicalizing Christ in a human image certain belief structures are inherent. God is a white man. The preceding cancels out two very broad groups: people of color and women. Thus the oppression of such groups become not only justifiable but a Christian duty. I bring in the issue of sexism not to confuse but to clearly illustrate the commonality of oppression through Christian dogma and biblical depictions and how the inability to see this connection helps to perpetuate the oppression of the disenfranchised regardless of the determined "affliction."

Endemic to this syndrome is people's refusal to recognize the commonality of oppressions. Hence, not only are there oppressed people in the world, oppressed people are oppressing each other! When Colin Powell supported the ban of gays in the military, I gasped with horror. He, a black man. Obviously he saw no connection between his oppression as a black and the oppression of gays. What oppressed people must come to understand is that in oppressing others they are fueling that very force which oppresses them.

For oppression is one thing. It is not a multiplicitous entity which manifests autonomous selves. It is a singular entity. No practice of it is excusable nor more heinous than the other. To be a bitch, a nigger, a fag is the same thing. We live in a society in which being White, male, rich, heterosexual and Christian are the supreme attributes of human actualization. Consequently, all who lack one or more of these attributes is relegated to a diminished role in society.

Within these same African American communities where such devout worship of white men as God is commonplace, are remnants of other expressions of self-hatred. Some deeply entrenched and psychological while others are clearly articulated verbally and in other overt ways. St. Thomas Aquinas said "The quality of being the image of God is co-essential to man because it is one with the rationality of his nature (Gilson, 1957). Race matters.

Summary

Terms such as "light-skin" and "good hair" are still very much common in the jargon of African-Americans. The notion that skin that is closer to white and hair that is closer to white are both more desirable attributes are still quite dominant themes in the African-American experience. That such ideology is symptomatic of the deeply entrenched self-hatred in African-Americans is secondary to the resultant, multiplicitous, negative side-effects of such psyches.

Such a notion of light skin and good hair cannot function as a singular pejorative idea. It must be reinforced from every possible social milieu. Supreme among these is the notion of how an oppressed people conceive of their god. Central to Christian dogma is the concept of Jesus as the son of God. Thus Jesus cannot be regarded as black with "nappy" hair by African-Americans. To look so would be to mean that his father, God, is black. And if he is black he's oppressed. Certainly, we cannot pray to an oppressed god. That would be useless. Those who are like me are as powerless as I am. No, we must pray to our oppressor for freedom--for deliverance from oppression. Jesus, the son of God, is a white man. He is a part of the power structure. From him it is possible to attain salvation. And because we believe that God is white we ourselves are demeaned in stature. For it becomes impossible to think of God in our own image.

This notion is clearly evidenced, reinforced, and communicated through common epitaphs in the African-American community such as "a nigger ain't shit" and "niggers and flies, I do despise." What is further ironic of this Christian syndrome of self-hatred and domination is that African Americans have become not only the victims but also the perpetuators of their own social and psychological oppression.

I am not asserting that African Americans are responsible for their own oppression. I am not asserting that these notions of self-hatred and white male worship are originated by African-Americans in an attempt to subjugate themselves. These are all "racist-reactionist" phenomena resulting from centuries of physical and psychological rape. However, despite this understanding the results are no less devastating.

Again, we must not hold responsible African Americans for the creation of such ills among them. I also understand the bitter protest with which my arguments will be initially met. One cannot undo such demonic racist machinations with a simple untying of a knot. There must be a radical deconstruction of the slave mentality with which African Americans have been burdened and a complete re-education. It will not be easy to show a people how the white Christ that they proclaim as savior is the primary nemesis in their oppression. Brainwashing and the strong binding of socialization are nearly insurmountable constructs. Self-hatred and oppression has been induced and is maintained through Christianity.

One of the ways in which we are maintained in oppression is through the assertion that there are races in the first place. For in order to have racism we must have race. "The existence of races in a given society presupposes the presence of racism, for without racism, physical characteristics are devoid of social significance It is not the presence of objective physical differences between groups that creates race, but the social recognition of such differences as socially significant or relevant (van den Berghe, 1967)." It is important that we are forever led to believe that there are races. This is necessary before one may begin to assert that there are innate differences amongst these races that justify the superiority of one to the other. This must be made to be despite any very obvious evidence to the contrary. It is clear that there is no genetic, biological, or anthropological, support to any such reality as "race." It is purely a mental practice. It is here solely to justify oppression and the advancement of the white male capitalist ideal. The concept of race is a portentous, iniquitous, socially-contrived construct rooted in fictitious ideology.

Liem and Montague (1985) state "A theory of racism is merely theory. Clearly it will take a mass movement to abolish racism. Yet anti-racists have struggled for so long as 'Black' activists or 'White' activists, each with their own 'separate but equal' roles, that to posit the racial distinction, itself, as an object of struggle, as a 'racist' distinction born of the pre-human, 'civil', age of humankind, must be regarded as an advance in strategy as well as in theory."

Such rhetoric as I have presented in the assertion that racial categorization is a psycho-social construct is not to deny that there are physical differences between people but rather to explain that such differences become incidental to a race argument only in retrospect. "The reification of racial categories into skin color, [eye shape, lip size, hair texture,] etc. is an integral part of the racial logic, and a careful critique of it will show us, for instance, the historical specificity of racism. Simply put, racial categories are social distinctions devised in such a way that their differential moment can be left to a 'superstitious' conception of nature. This engenders the illusion that nature itself has dictated racial categories for us (Chang, 1986)."

The devastating effects of white supremacist ideology on the psyche and self-concept of African Americans as perpetuated through the media and the tenets of Christianity have been profound. Thus it becomes incumbent upon us to eliminate racially-biased images from all vestiges of our culture. Until such efforts are made we will continue to consciously and subconsciously promote the notion that all humans are not equal and in so doing prevent our society from being a positive place for all the world's citizens.

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The Growing Need For Visual Literacy At The University

by Jerry T. Christopherson

Abstract

Current research at Brigham Young University determined visual literacy is important to Engineering, Nursing, Business, Social and Family Sciences, and Fine Arts and Communications. The research also determined that an intermediate level of proficiency creating visual communication is necessary for students in all five colleges. An honor's course providing theory in the basic design of visual communication and hands on production in desktop publishing and desktop multimedia is being piloted and evaluated. The course fills an Arts and Letters or Social Science general education requirement and a faculty survey determined more than 1500 students a semester need this type of course.

Introduction

Reading, writing and arithmetic has typically been consider the basic components of literacy. However, today the word literacy has taken on a much broader definition including computer literacy, media literacy, ecological literacy, financial literacy and so on. Educators, parents and politicians often cry for a return to the basics. But now the question is: what is basic (Postman, 1995)? Is reading and writing enough to be literate in what has come to be called the technology age? Or do individuals need a whole host of other skills to be labeled "literate"?

Along with massive advances in technology has come a significant increase in visual imagery. Each day we are bombarded by a steady unrelenting stream of visual images from 260,000 billboards, 11,520 newspapers, 11,556 periodicals, 23,237 movie theaters and drive-ins. More than 27,000 outlets are available for renting videos; 162 million television sets each play for 7 hours every day (Forsberg, 1993). Between the ages of three and eighteen, the average American youngster will see about 500,000 television commercials, which means that the television commercial is the single most substantial source of values to which the young are exposed (Postman, 1995).

Years of research and experience have gone into learning how to manipulate the elements of design (color, line, size, shape, value, texture, light, sound, and movement) to elicit certain emotional responses from the viewer, emotional responses that often lead to predictable behavior And yet, in the mist of this image explosion visual literacy is still not considered basic to an individuals general education (Lester, 1995).

In *Towards a Psychology of Art*, Arnheim states that visual literacy is the attribute we would hope to find in every well-educated adult in our society, because our culture is increasingly represented and perceived in visual terms (Arnheim, 1967). Perhaps more than any other time in history, we need to teach people how to develop a critical ability which will enable them to judge visual images accurately and behave appropriately (Forsberg, 1993).

Visual Literacy At Brigham Young University

The number of individuals at Brigham Young University (BYU) creating visual images is increasing exponentially. Lower prices and simplification of operations are making it easier for more departments to do their own desktop publishing and desktop multimedia. However, access to equipment and ease of production does not imply increased effectiveness. Few individuals, outside of the visual arts ever receive training in how to apply the basic principles and concepts of design to visual communication for their specific discipline.

"I'm visually illiterate" was a statement I heard over and over again in the past three years as I interviewed faculty from Business to Botany, from Engineering to Economics, and from Computer Science to Communications. If so many "well educated individuals" outside the arts are feeling visually illiterate the question needs to be asked—why isn't visual communication part of the university curriculum?

The Definition Problem

According to Roberts A. Braden, part of the problem has been the lack of agreement among experts as to what term to use in reference to this area of study. Cassidy and Knowlton wrote a major paper in 1983 entitle "Visual Literacy, a Failed Metaphor?," (Braden, 1995) and Moore and Dwyer included a chapter in their visual literacy textbook titled "Visual Literacy: The Definition Problem" (Moore & Dwyer, 1994).

If "Visual Literacy" is a failed metaphor is there a better term? With the assistance of Professor Dillion Inouye (Instructional Psychology) an instrument was developed to measure the effectiveness of one term over another. Individuals were asked to rate on a seven point Likert scale how well six terms: Media Education, Visual Literacy, Visual Communication, Media Literacy, Visual Thinking, and Multimedia Design captured the concepts, principles, and competencies associated with this area of study.

Judith C. Baca's dissertation *Identification by Consensus of the Critical Constructs of Visual Literacy: A Delphi Study* was used as the bases for the list of targeted competencies (Baca, 1990). Surveys were completed by BYU students and faculty as well as individuals participating in the 1994 Regional 8 AECT Conference. The data was entered into a traditional statistical software program Statview and the analysis of the data identified "Visual Communication" as the better term to use in referring to this area of study.

However, another statistical software program called DataMax was used to conduct further experimental analysis on the data. DataMax was used because of its ability to display multidimensional and multivariate data in a visualized graphic display. The program was developed by Brigham Young University and commercially distributed through Echo Solutions corporation of Orem, Utah. When the data was plotted three dimensionally one best term was difficult to identify. The graphs revealed the extreme multidimensionality of this area of study. Depending on the dimension you choose Visual Communication, Visual Literacy or Multimedia Design, could be considered the better term.

Visual Communication—was the better term when emphasizing the development of traditional visualization skills, learning the basics of color theory and typography; understanding the vocabulary of visual design, using visuals for the purpose of creativity and aesthetic expression, and using visuals for the purpose of communicating.

Multimedia Design—was the better term when emphasizing the combining of visuals with words, movement, sound, music, and time; and proficiency using personal computers with multimedia technology.

Visual Literacy—was the better term when focusing on critically viewing—interpreting, analyzing, evaluating meaning, and judging the quality of visual media. Visual Literacy is the *best* term for encompassing the dimension of visual thinking, visual learning, and using visuals for the purpose of constructing meaning. If we include the general need to develop an awareness and defence against visual manipulation and the historical and social aspects of visual communication —"Visual Literacy" is still the *best* term.

Though Baca's research made significant strides towards bringing experts into agreement on what it means to be visually literate—brevity and conciseness of definition is still needed if visual literacy is to be accepted as general education among those in disciplines outside of the arts.

Identifying The Need

Beginning in the spring of 1993 I designed and conducted a technology needs assessments for BYU. Surveys were filled out during personal interviews asking participants to identify the need for multimedia production, computer classrooms, and basic instruction in design theory. One faculty member from each of the 83 departments at BYU were randomly selected.

Three major needs at the university were identified by this study:

- Training for faculty and students in desktop publishing and desktop multimedia is needed
- General education credit needs to be given for a course in basic design
- Faculty and students want access to production equipment

After the results were reported Dr. E. Curtis Fawson, director of BYU's Instructional Technology Center and his staff moved forward and developed a *"QuickStart"* training series to meet the need for faculty training in multimedia production. Monty Shelly the director of BYU's Instructional Application Services (IAS) doubled the number of computer classrooms available for instruction. However, the demand for access to the desktop publishing and desktop multimedia computer classroom has already exceeded its capacity. To meet the needs for student instruction Bruce Christensen, the Dean of the College of Fine Arts and Communication, agreed to fund the development and implementation of an Honor's general education course focusing on teaching the basic design of visual communication to non-artists.

A Visual Literacy GE Honors Course

A proposal was drafted laying out the objectives and the content for the new course. Dean Christensen requested an additional needs assessment be conducted to determine the interest in offering such a course. Once again a study was designed to survey BYU's 83 departments. After completing just 15 interviews the numbers had all ready become staggering. Over 1,500 students a semester needed this type of course. The main concern was how to add this needed course to an already bulging curriculum. The critical issue was to get the course approved as a general education course.

The proposal to pilot the course as an honor's general education Arts and Letters course was submitted to the University. The course was approved and piloted Winter Semester (January through April) 1996. The success of the course depended on the collaboration of five different academic departments (Visual Arts, Communications, Film, Business, and Communications) and six service departments (Media services, Print services, KBYU television, Computer support services, Continuing Education and the L.D.S. Church Motion Picture Studio). The lectures were presented by full-time, part-time, and retired faculty while the desktop publishing and multimedia production was taught by full-time working professionals. The faculty student evaluation rating was exceptional and the students gave the course an excellent rating.

What Level of Proficiency in Visual Literacy Is Needed

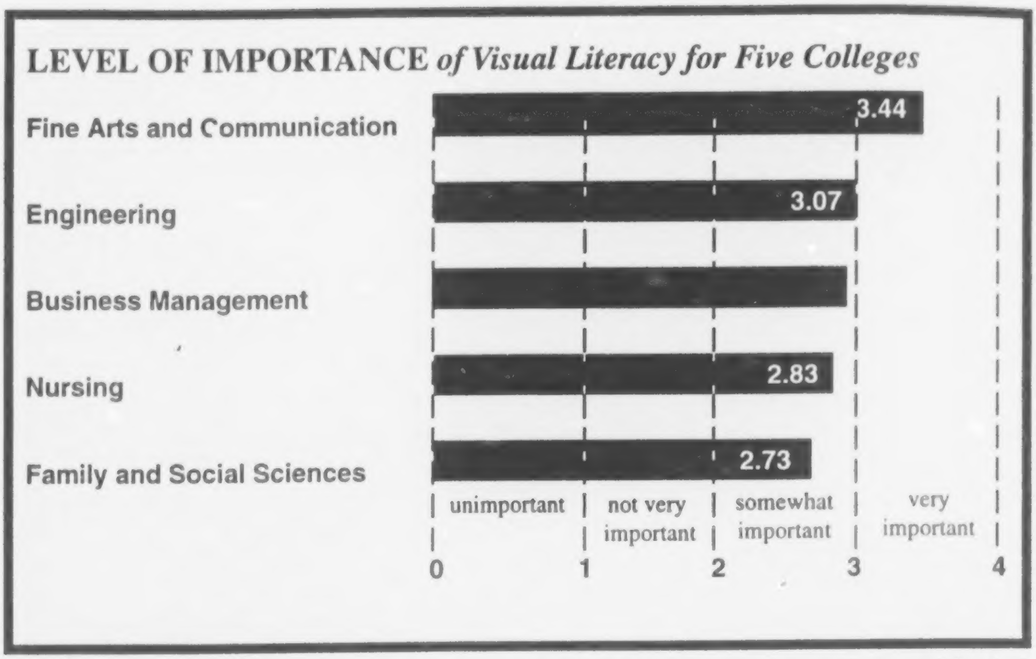
Besides providing lectures and instruction to increase visual literacy research needed to be conducted to determine the level of importance and the level of proficiency need in visual literacy for the different disciplines. With direction and encouragement from Professor Victor Bunderson, an expert in the area of instructional measurement, another survey was designed and conducted using Baca's six visual literacy constructs. Five of BYU's 12 colleges were selected. The sample size was set at 50, ten participants from each of the five colleges.

The colleges selected were:

- Nursing
- Engineering
- Social and Family Sciences
- Business
- Fine Arts and Communications

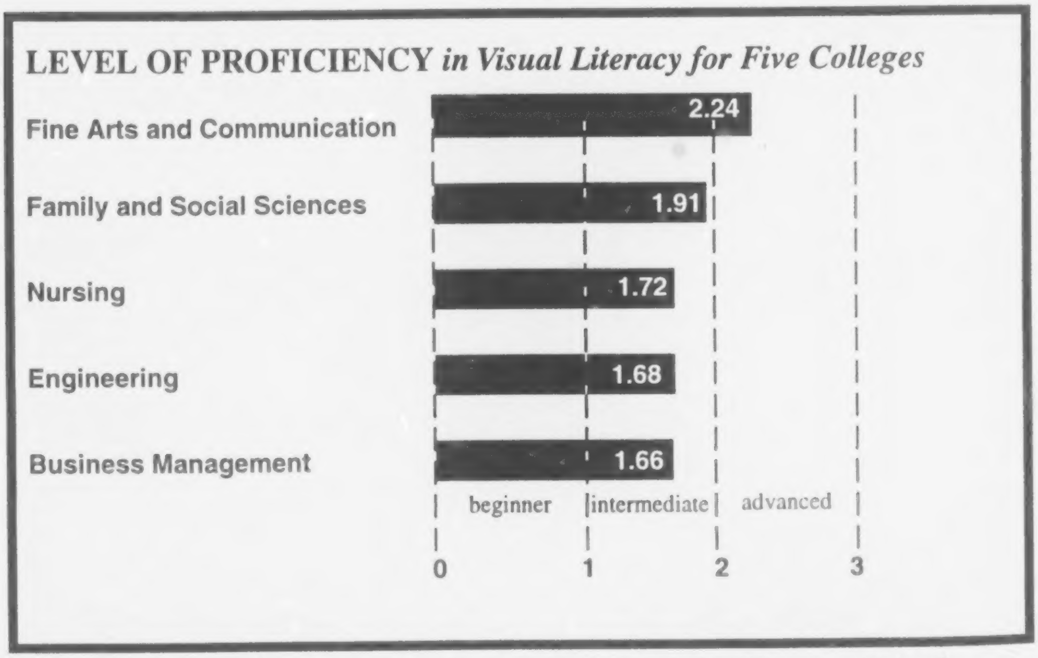
Combining personal interviews with a survey had been so well received in the previous needs

Figure 1



Visual Literacy is somewhat important to all of the disciplines within the five colleges. The overall level of importance is 3.00. Not surprisingly visual literacy is more important to the disciplines within the College of Fine Arts and Communications.

Figure 2



The overall level of proficiency for the five colleges is 1.84. This level of proficiency was higher than expected. The GE course is meant only to be an introduction, a beginning level course.

assessments the method was repeated. Seventy-one personal interviews and surveys were completed.

Results

The statistical analysis of the data revealed visual literacy to be somewhat important across all the disciplines and identified an intermediate level of proficiency is needed by students in all five of the colleges. The data analysis also facilitated regrouping Baca's 167 items into four constructs rather than six.

A more concise answer can now be given when asked: What *does it mean to be visually literate?* A visually literate person is able to:

- Interpret, understand, and appreciate the meaning of visual messages
- Communicate more effectively through applying the basic principles and concepts of visual design
- Produce visual messages using the computer and other technology
- Use visual thinking to conceptualize solutions to problems

Problems

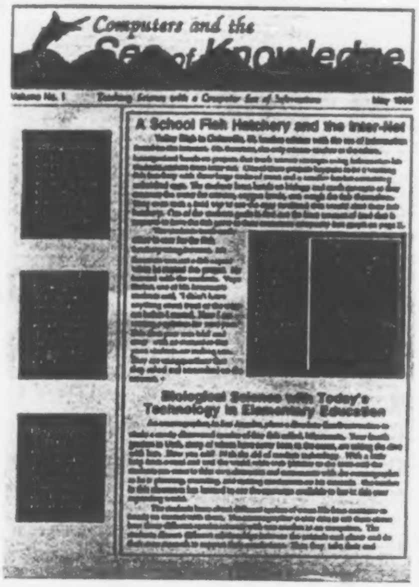
Only A Beginning Level Of Proficiency

Though the Honor's GE course received a very positive evaluation, this one course can only provide a beginning level of proficiency. Each student completing the course produce a newsletter (refer to figure 3), a five minute computerized presentation and a Quicktime movie. These projects look pretty impressive when compared to what the students have been able to produce prior to the course. A concern by some of the Visual Arts faculty is students may feel they have acquired an intermediate or advanced level of proficiency.

A reliable and valid means of measuring each students level of proficiency prior to taking the course and after completing the course is critical. Additional instruction, self instructional or in-class with a teacher, must be made available so an individual can obtain the level of proficiency necessary for their specific discipline

Figure 3

Student Newsletters

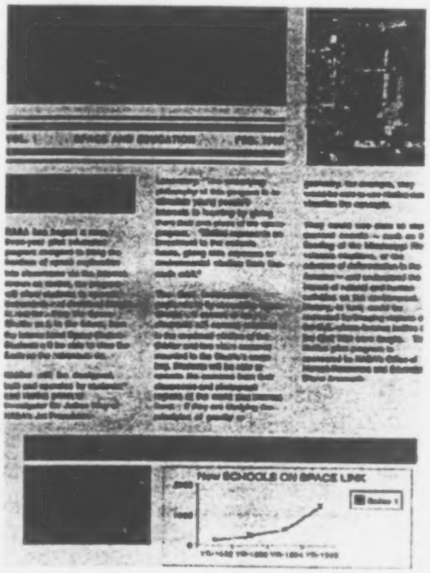


Computers and the Sea of Knowledge

A School Fish Hatchery and the Inter-Net

Biological Sciences with Today's Technology in Elementary Education

These are examples of newsletters created by students who have only had four one-hour lectures on the basic principles of document design



SPACE AND EDUCATION

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Does The Need Justify The Cost?

Del Scott, the Assistant Academic Vice-President of computing at BYU, agrees every student would benefit from a general education course in visual literacy. But his concern is how do you provide the computer support for such a course. Two thousand students a semester is a conservative estimate in his opinion. If each student were given just 6 hours a week of computer time this would amount to 12,000 hours a week, at least 10 labs with 24 computer stations, 240 site licences for desktop publishing and an equal amount for multimedia production. Then you have to add the cost of training the 2,000 students each semester. He didn't say the University couldn't do it but that costs and needs must be justified.

Giving Individual Feedback

Providing equipment and paying for instruction for large numbers of students will be a challenge but so is developing effective large group instruction. Paul Merrill, the department chair of BYU's Instructional Science Department in the College of Education ask if the instruction in basic design concepts and principles, being developed for the GE course, could be piloted in the Instructional Technology in Education course. Approximately 300 Elementary and Secondary Education majors take this course each semester and need instruction in visual literacy. He realized it could be several years before the GE course would be available for more than just a few students.

The newsletter assignment has been given to approximately 900 education majors over the past several semesters. Evaluating each newsletter and giving students individual feed back on the effectiveness in applying the basic principles of good design has been overwhelming. However, feedback is critical to the learning experience. This semester the student lab assistants are being trained to evaluate the newsletters, give students feedback and grade the newsletter

Visual Literacy Requires Change

The research conducted at BYU over the past three years shows that visual literacy is important in the disciplines of these five colleges. According to Becky Beus, an instructor at Boise State University and part of the public relations team at Micron Technology, students with visual communication skills are more marketable. The standards for corporate presentations are changing— today visuals are expected and computer skills have become "basic" to our society. Change is often referred to as the one constant in our society and Neil Postman indicates change in educational curriculum comes slowly but it does come.

Brigham Young University made a change so 31 students could receive Arts and Letters general education credit for a visual literacy course. Starting in January of 1997 sixty more students will be able to enroll in *An Introduction to the Basic Design of Visual Communication* and receive GE credit in either Arts and Letters or Social Science. Persistence and patience will be necessary if we hope to see visual literacy become basic to a university education.

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Imagery and Synectics for Modeling Poetry Writing

by Jeanne L. Dykstra and Frank E. Dykstra

Abstract

In this paper, Gordon's synectic mechanisms (1961) are incorporated into introductory poetry writing instruction. Some students have difficulty with the concept of metaphors (McClure, 1986), an element that distinguishes poetry from prose (Lukens, 1995). Gordon and associates isolated means to think metaphorically by using mechanisms most people possess in their experiential background. The method of poetry instruction demonstrated in this paper was developed using theories and research findings of Gordon (1961), McClure (1986), Rosenblatt (1983), and Lukens (1990, 1995).

Background of Synectics

Synectics, translated from Greek, is "the joining of different and apparently irrelevant elements" (Gordon, 1961, p.3). In 1961, Gordon described the creative process he and the other members of the Cambridge Synectics group used as a means for problem-stating and problem-solving. This creative process was labeled synectics, the use of thinking in metaphors to see the familiar in unfamiliar ways or the unfamiliar in familiar ways. Metaphors are broadly defined in this paper, as being all inclusive of figurative language such as similes, and personification, as well as metaphors. Gordon states that "Synectics defines creative process as the mental activity in problem-stating, problem-solving situations where artistic or technical inventions are the result"(p. 33). Couch (1993) and Joyce & Weil (1986) suggested that synectics be incorporated into public school instruction. We will take this one step farther by describing how synectics mechanisms may be used in introducing poetry writing to public school students.

Purpose of Paper

The purpose of this paper is to show how synectics mechanisms can be used to instruct students who are beginning to write poetry. Research findings and theories on beginning poetry writing instruction (Graves, 1992; Rosenblatt, 1983; Lukens, 1990; McClure, 1986) was combined with a variation on Gordon's synectics mechanisms (1961) to suggest a means of beginning instruction on poetry writing.

Why Gordon's Synectics Mechanisms?

It is the increased use of metaphoric language that distinguishes poetry from prose (Lukens, 1995). Therefore, instruction on metaphors would be desirable. Although some research findings such as McClure's (1986) concluded that the concept of metaphors may be difficult for some children to understand, who have not reached Piaget's concrete stage of development. Since Gordon's synectic mechanism uses the types of metaphoric analogies which most people have experience with to some degree from their everyday life, it would be logical to include Gordon's synectics mechanisms in beginning instruction on metaphors. Gordon's synectics mechanisms include personal analogy, direct analogy, symbolic analogy and fantasy analogy. It is through the inclusion of these analogies that the concept of metaphors begins to be understood by students.

Joyce and Weil (1986) incorporated personal analogy, direct analogy and use of oxymorons labeled as "compressed conflict"(p. 167) in their variation of Gordon's synectics for public school instruction. Some children, who are not at Piaget's concrete stage of development may not comprehend the concept of symbolic analogy (Lukens, 1990) and may become confused with oxymorons, the joining of contradictory terms, therefore, this paper concentrated on personal analogy, direct analogy and fantasy analogy.

Introduction to Poetry

Instruction for students should begin with reading poetry aloud to students without analyzing it. Plenty of wait time should be provided for students to respond to a piece of poetry. What is important is their reaction, their connection with the poetry, not the teacher's interpretation (Rosenblatt, 1983). Without direct influence of the teacher, students have more opportunity to reflect and form their own interpretations, reactions and attachments.

Introduction to Writing Poetry

One of the easiest ways to begin writing poetry is with a list poem (Graves, 1992). The teacher might model imagining a scene or object paying attention to his/her senses in order to include descriptive words or even metaphors in the list. The advantage of one word lines is that it helps the student writer to focus on how each line triggers another. Students should be encouraged to include words which describe their feelings while imagining a scene from the topic of their choice. Words are jotted down just quickly as they are perceived without worrying about the final composition.

Another way to begin instruction is with writing prose (Graves, 1992). This gives the students the freedom to follow the flow of their words, without worrying about line breaks. Topics come from the students, thus increasing the chance for interest because of the opportunity for relevancy. They should write quickly, not changing the words as they write. Rereading the prose may trigger their thinking about a few metaphors for their poem. In the last step, the students take some of the notions from their prose and change them into approximately three to six-word phrases per line.

The Connection of Metaphors to Self-Generated Imagery

Students may increase their ability for self-generated imagery when they think metaphorically. Pressley's (1977) research indicated that the ability to self-generate imagery is related to the amount of experience as well as age. Therefore, more experience with working with metaphors should increase the students' ability to self-generate imagery.

Application of Synectics Mechanisms

When students reread their prose piece, they may find using Gordon's synectic mechanisms of personal analogy, direct analogy and/or fantasy analogy helps them to rewrite with the addition of metaphors. The student writer tries to imagine what he/she wrote in a different light using these mechanisms. Success is more certain if the teacher models using one or all of the analogies to rewrite a prose piece with metaphors. For example, the following piece of prose was quickly jotted down from thoughts about a frog:

> There he sat this frog of mine, green, slippery and long-legged. Those eyes watching mine as if trying to say something. I never anticipated the hop, then the kiss from his lips.

The prose is just a gathering of thoughts/ideas that can be transform into a poem by including metaphors, shortening the sentences into brief phrases then rearranging the spacing for lines.

Using Analogies

Concentrating on the first sentence, I become the frog by using a personal analogy, that is, asking myself what is it like to be a frog? I am green. This is good, because I can hide among the green grasses. I could phrase this as "greened himself among the leaves and became unseen."

In the second sentence, I could use the personal analogy by becoming the eyes. What would I want to do? I want to speak and what I want to speak about is hoping the narrator would love me. This can be written as "his eyes spoke of wanting to be mine."

Direct analogy can be used to compare the image of the frog's hop as a rabbit's quick hop. Finally, I could make a fantasy analogy by asking myself what would be something I would wish for in this poem? I would wish that the kiss was not from a frog but from a prince.

I could write the "kiss was soft as a prince." The final steps would be to remove any unnecessary words so there are phrases approximately three to six words long. Then break the lines where my voice naturally fell or paused for a breath.

Frog of Mine

There he sat
this frog of mine.
Greened himself among leaves
and became unseen
except for his eyes which spoke
of wanting to be mine.

Being long-legged
he popped-up quick
like a rabbit.
Slipped a kiss,
a kiss soft as a prince.
I opened my eyes
and he become one.

This poem used all three analogies but all three do not have to be used in creating a poem.

Conclusion

In conclusion, the concept of metaphors can be difficult for some students to understand. Yet metaphors are necessary for creative poetry writing. Therefore, instruction on metaphors should be included. Gordon (1961) has isolated a means of thinking metaphorically by using synectics mechanisms which most people have already experienced in some degree in their daily living. Thus including these mechanisms in instruction would seem to be the simplest and most likely the most effective way to introduce metaphors into students' writing.

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Virtual Courses And Visual Media

William J. Gibbs
Patricia J. Fewell

Abstract

There are a number of issues that must be addressed when delivering courses entirely on-line such as designing effective user-interfaces and using the visual medium of the WWW effectively for instructional purposes. This paper discusses the implementation of a on-line course and reviews issues related to the visual design and development of instructional materials for use on-line.

Introduction

The Internet and the World Wide Web (WWW) are greatly impacting education. The vast network of networked computers known as the Internet enables, among other things, access to a worldwide database of information in a variety of mediated forms.

The accessibility of information over the Internet affords educators many advantages and challenges in terms of instruction and learning. The advent of the WWW enables the distribution of on-line courses and entire degree programs. Class materials can be made available 24 hours a day from anywhere in the world. This makes it possible for learners to enroll in courses regardless of their physical location.

What is a Virtual Course

A virtual course is a learning experience delivered within a computer-based information system. There are no walls or chalkboards but rather work environments; facilities and group communications are facilitated through software and hardware (Hiltz, 1995). Instructors and students can be in non-centralized locations so that instruction is distributed independent of time and physical distance. Consequently, students do not travel to the university or college but participate by interacting with a personal computer connected to the Internet. Course content can be accessed at any time from any location in the world.

The virtual classroom is comprised of many of the same learning tools and forms of interaction that occur in the traditional classroom. "All of these things exist within the virtual classroom, too, except that all the activities and interaction are mediated by computer software, rather than face to face interaction." (Hiltz, 1995 p. 5)

Virtual courses are typically asynchronous which means that there is no prearranged time or place of meeting. Synchronous learning occurs when the instructor and students agree to meet at a particular time and place to engage in some form of learning activity. Most traditional instruction takes place synchronously. Asynchronous learning, on the other hand, typically provides information and instructional materials which are accessed at a time and place that is convenient to the student. For example, when the WWW is used to present a lesson, instructional materials and activities can be made available for students to access at any time, from any location in the world provided that they have the appropriate hardware and software.

It should be mentioned that not all instructional uses of the Internet and WWW are courses delivered completely on-line. Many instructors utilize web-based materials to reinforce, supplement and compliment information presented during in-classroom lectures.

Purpose of Paper

In the Spring semester of 1995, Eastern Illinois University offered "Technology in the Classroom" (EDF 4998) as a "virtual course". The course emphasized various aspects related to the theory and practice of technology and media (specifically computers) for learning. It focused on relevant issues related to the design, development, and evaluation of computer-based learning programs. Instructional communications among students and instructor were done asynchronously via the Internet.

There are a number of issues that must be addressed when delivering courses entirely on-line such as designing effective user-interfaces and using the visual medium of the WWW effectively for instructional purposes. This paper discusses the implementation of an on-line course, EDF 4998, Technology in the Classroom. It reviews issues related to the visual design and development of instructional materials for use on-line.

Course Overview: Interactions

There were four primary means by which the instructor, student, and peer-to-peer interactions took place in EDF 4998: 1) electronic dialogue via email and listserv, 2) the WWW, 3) the telephone, and 4) the postal system. Most information disseminated from the instructor to students occurred by electronic mail and the WWW. Each week lecture notes were delivered over the WWW, the purpose of which was to illustrate concepts and ideas, summarize topics, pose questions, and present assignments. Students reviewed these materials at a time convenient to them and responded with reactions, comments, and questions through electronic mail.

Students turned in weekly assignments which were sent to a listserv for the entire class to review and discuss. The final exam and other confidential assignments were sent directly to the instructor by electronic mail. A few students opted to send some of their major assignments through the postal system.

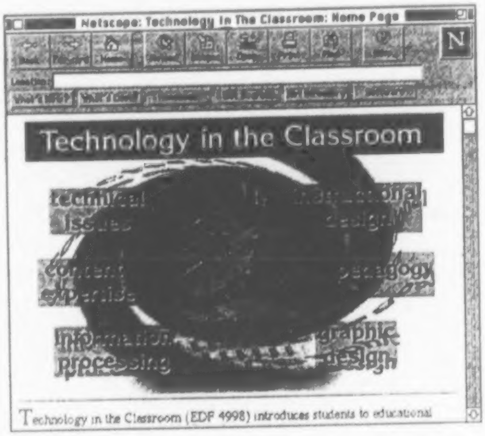
The majority of interactions between instructor and students were done electronically. Occasionally, students used the telephone for personal questions and comments (e.g., not being able to complete work by the assigned deadline, etc.) but this was limited.

Most student-to-student interactions occurred through electronic mail and by telephone. The telephone was particularly useful in emergencies. For example, to complete a group assignment, two students had not received email from their partner in two days and thus telephoned to inquire as to his whereabouts.

Modifying Materials

Conventional expository instruction in which the instructor is the primary disseminator of information is not always effective for on-line courses. Adapting instruction to the virtual course requires modifying traditional instructional methods and media. Much of the electronic dialogue that took place in EDF 4998 was conducted through facilities such as email and listservers. The WWW was used for weekly lecture notes, assignments and projects. These media forms are visual in nature and using them to facilitate interactions and convey course content requires, among other things, a clear understanding of how to convey information visually. Figure 1 below shows the home page for EDF 4998.

Figure 1
EDF 4998 Home Page



Technology in the Classroom (EDF 4998) introduces students to educational

Electronic Dialogue

One of the most important factors which determines whether students perceive the virtual class to be better or worse than traditional instructional modes is the extent to which they interact and the quality of their interaction (Turoff, 1995).

The mode of interaction and the interface between instructor and student is much different in a virtual class. For example, instead of listening to the instructor, students navigate through computer-mediated content and exchange electronic dialogue. In a traditional class, student questions can be managed effectively with verbal responses but in the virtual class this dialogue must be typed, a far more laborious task. Posing a question verbally requires less physical effort and time than if the same question was typed.

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Moreover, when a message is typed it has a degree of permanence compared to a verbal message which diminishes after the words are spoken. Consequently, an author may exert more time and effort composing his/her thoughts for a typed message than one that is conveyed verbally. Also, the nature of the virtual course is such that responses to questions do not have to occur immediately. This may promote a tendency to spend more time and energy reflecting and developing elaborate responses.

The virtual classroom enables students to ask questions privately and at any time of day or night. Students who would never venture to speak out in a traditional classroom may be inclined do so under these circumstances. This combined with the fact that most dialogue is sent electronically produces a large amount of electronic mail. If 20 to 30 students enter a minimum of 5 questions or comments a week plus assignments, the number of entries per week grows substantially.

Guidelines For Electronic Dialogue

Unless the course requires a specific email application, instructors may not be able to control, to any great extent, how students' electronic messages appear visually. The type of programs used for receiving and sending mail will vary from student to student. Nevertheless, there are some things that instructor and students should keep in mind.

To maintain interest, instructors should use written language in a skillful way including the use of humor and metaphor (Turoff, 1995). Students should be encouraged to do the same. This applies to both email and WWW materials. The dynamics of class interactions will change dramatically when creative dialogue is shared. For example, in one class a student constantly interjected colorful analogies and examples. As a result, other students began to react to his colorfulness. While this dialogue was not always related to course content (in the instructor's opinion) it helped build class cohesiveness.

When possible use short concise sentences and simple vocabulary (Hartley, 1985). Remember students will be reading a lot of information.

"For best legibility, use lowercase letters, adding capitals only where normally required." (Heinich, Molenda, Russell, Smaldino, 1996, p. 76). Often instructors and students type electronic messages in upper case. This should be avoided not only because it is more difficult to read but also, depending on the nature of the message, capitalization is often associated with "shouting" on the Internet.

Text lines should not be too close together or separated too far apart (Heinich, Molenda, Russell, Smaldino, 1996). Some students will place a blank space between each typed line. This can make the text lines appear disjointed and difficult to read.

Use headings and whitespace effectively. When students submit an assignment electronically, they may be more informal than if it was submitted on paper. For instance, terms might be abbreviated or less formal language used. Also, the appearance of documents may not be comparable to those submitted on paper. There is often the tendency to send electronic documents (e.g., mail messages or assignments) as a single block of text. While this is not a problem for short email messages, it is problematic as text documents get longer. In the virtual class, students need to organize information with descriptive headings and text segmented by whitespace.

Because so much electronic dialogue is exchanged, instructors should encourage students to identify themselves as the author of the information submitted. At minimum, request that students type the following at the beginning of each document:

From: Student's Name
Topic:

This helps instructors identify the author of the assignment and prevents documents form being lost or deleted.

The World Wide Web

In addition to electronic mail, the WWW is another primary means by which to disseminate information in the virtual course. The WWW like other hypermedia environments, frequently contains documents designed as scrambled, content-free information or gibberish (Stanton & Baber, 1994). While technologically web site developers have the capability to include pictures, text, audio and video in documents, design protocols for doing so differ from one site to the next. This confuses users and increases the possibility of users getting disoriented. As the number of nodes and the complexity of their links increase, it is not unusual for the users of a complex hypermedia program to get lost (Park, 1991).

The level of frustration and disorientation users experience when viewing web-based instructional materials is often contingent on an intuitive user interface and the user's familiarity with the WWW. Depending on the nature of the virtual course, student skills may range from novice to expert. It is especially important for the novice that WWW documents be effectively designed and that the interface be intuitive. Well designed documents that have a clear and uniform user interface enable students to navigate content more easily (Knupfer & Clark, 1996).

In the virtual course, peer-to-peer interactions and instructor-to-student interactions are generally on-going and not limited, for example, to a 1 hour block of time as in a traditional course. In most cases, students and instructor exchange dialogue at all hours of the day on a daily basis. While such dialogue is on-going, it is often not immediate. A student may pose a question, idea, or comment and not receive a response for hours. This is one reason why every attempt should be made to reduce interferences to instructional content (e.g., poorly designed interface) and frustration to the learner. If students become disoriented by WWW documents or do not understand how to access content, they may not be able to find a solution for several hours which can increase their anxiety and frustration.

In developing course materials for the WWW, there are several things to keep in mind. The items discussed below are some basic suggestions that virtual instructors may find useful.

Present a sensible ordering of information by topic. Learners often visually scan WWW documents without reading detail and thus need a means by which to easily locate necessary information. Instructors should provide a good visual overview that allows students to quickly find a particular topic or document. Provide a topic listing or table of contents, a hierarchy of topics, or a means by which to search for a topic. Where possible, create conceptual maps for instructional content. Maps illustrate node and link relationships and provide a visual guide to the to-be-found information. Maps also demonstrate structural knowledge or how a particular topic or concept is structured relative to other topics and sub-topics.

WWW documents often present numerous options/links from which to choose. This can confuse learners and make it difficult for them to decide where to go next. To address this issue categorize links into two major groups: 1) essential links which lead to essential information, and 2) supplemental links which provide related but divergent information. An example could be a hypertext version of a technology textbook. Links that lead from page one to page two or from chapter 1 to chapter 2 are essential links. References or citations on a particular topic, author or experiments are supplemental links.

Create a consistent navigational design that enables students to easily obtain documents that relate to the document being viewed. This can be done by providing access/links to the original table of contents or main home page. Another technique is to designate a portion of the screen (top and/or bottom of screen) for navigational elements. In this area, position links that relate to the document being viewed.

Do not make documents longer than necessary if they can be segmented into more then one file. The length of time involved in retrieving long documents can be considerable depending on users' hardware. Students in the virtual course often have modem access and therefore it takes them longer to download WWW documents. This problem is compounded when graphics and pictures are added.

Much like electronic mail, long documents can be visually overwhelming to users. Instructors need to reword or abbreviate text so it will fit within the visual design of the screen (Knupfer & Clark, 1996). Additionally, reading a computer screen is more difficult than reading from paper. It is preferable to use larger font sizes (e.g., size 4 in HTML coding)for easy reading.

While WWW documents are non-linear, readers often read them linearly. Thus, it is a good idea to provide a linear pathway through documents. This could be accomplished by providing links that allow users to proceed from one screen or topic to the next. (Tilton, 1996).

Users make navigational decisions based

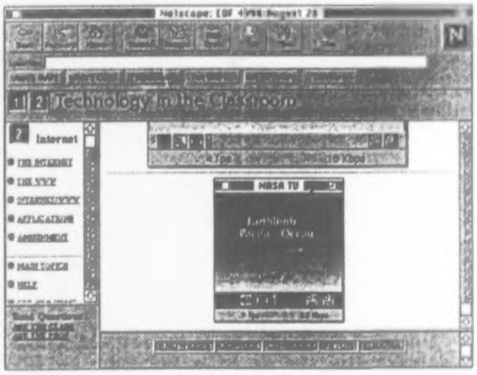
on informational content. They read the text on-screen and made inferences as to where they might find more related information. Visual cues and navigational links should support and/or coincide with the informational content. Descriptive heading, titles and links are important during information searches.

Using Frames

It is a challenge for instructors to create well-designed web-based instructional materials. Among other things, the computer screen restricts students' view of the overall instructional content (Knupfer & Clark, 1996).

Frames enable several web documents to be opened simultaneously in the computer screen area. Each document is apportioned a segment of the screen for display. From the experience in EDF 4998, frames served two primary functions. First, they helped to visually organize information. Second, frames enabled consistent visual referents (e.g., menu selections) to be used which assisted user navigation. Figure 2 below shows an example of a screen using frames.

Figure 2
Frames: Sample Screen



Typically in WWW documents, a user makes a selection and is taken to a document in which a new screen of information is presented. Information at the previous location is no longer visible. Commonly, users of the WWW make selections superficially and when arriving at the destination document, they no longer remember their previous selection. As the amount and complexity of information increases, confusion may result. This has implications for virtual courses. It is important for students to understand the paths through which they traverse instructional content. When students become confused or disoriented or do not know how they arrived at a particular destination, they will be less likely to acquire the presented information and more likely to become confused.

Using frames in WWW documents can help circumvent this problem. For instance, imagine a document divided in to 3 separate sections. At the top of the screen, a one inch "Title" frame contains the title of a particular week's lesson. On the left side of the screen, a two inch wide "Menu" frame lists topics for the week. The remaining portion of the screen is the "Content " frame used for the presentation of instructional content. When users selects any of the links in the Menu frame, information displayed in the content frame changes. The Menu does not change. Therefore, students are provided a constant visual referent to the week's topics and the sequence in which they are organized and presented. Students can navigate across instructional content without loosing sight of how to get back to the Menu list or how to select a new topic.

Summary

The Internet and the World Wide Web offer many new opportunities for educators. This is a medium by which learners have access to information around the world 24 hours a day. The classroom as we have known it is expanding to world-wide proportions. Classes can link to other classes at distant universities to exchange ideas, solve problems and discuss various topics. Likewise, regardless of physical location, scholars and business professionals can, with relative ease, enter the classroom to share perspectives and knowledge.

The virtual course is visual in nature. Typically no verbal dialogue is exchanged between instructor and students. Most communication is done visually through the WWW and text messages using electronic mail. Given the visual nature of the virtual course, instructors need to think visually while at the same time understanding the current limitations of the medium. While graphics and pictures may, for example, be more effective at conveying meaning than long scrolling screens of text, too many

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pictures cause problems for students accessing class materials through a modem.

Despite current limitations, the Internet and the WWW hold great potential for instruction and learning. As educators become involved with the "virtual course" it is important to remember that it is a visual medium. Sound principles of visual design can improve, among other things, the aesthetics of on-line materials, how they are organized, and their effectiveness at conveying course information.

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Travellers And Cowboys: Myths Of The Irish West

by Gretchen Bisplinghoff

Abstract

The recent Irish film "Into the West" (1992) explores the myth of the West on two continents. The image of the horse operates as the common denominator to the exploration of both myths. The horse as visual icon crosses boundaries of space, time and culture to explore the elements of Hollywood genre in the Irish landscape.

The West Of Song And Legend

After spending the night in town, two young "cowboy-bandits" wake up to find themselves surrounded by the law. To escape, the duo jump down from a balcony onto the back of their trusty mount, a fiery white stallion. To their cries of "Hi Yo, Silver," the magnificent horse rears up, pawing the air, before leaping forward to make their getaway. In an earlier scene, horse and riders are foregrounded against the majestic sweep of distant mountains. As they approach, riding straight down the dusty road toward the camera, the "cowboys" are singing. The camera slowly tilts down to the great horse's hooves, as he prances in time to their song: "Let's go riding way out West. Let's go riding way out West." However, these cowboys are riding into the West of song and legend, of myth and mountains not on the great white horse Silver, but on the magical steed Tir na nOg, and they're not headed for the Rockies, but for the Wicklow Mountains and Killarney.

The recent Irish film "Into the West" (1992) explores the myth of the West on two continents. The riders on horseback are two young Irish boys, Tito and Ossie, who have heard their Grandpa Reilly tell stories around the campfire about the magical land of eternal youth beyond the mountains and over the sea. Grandpa's stories of the Irish West of legend become intertwined with and filtered through the boys' fascination with the American West of cowboys and Indians as depicted in countless Hollywood versions. The Hollywood version of American history informs the action in Ireland throughout, from the boys' evocation of key elements and re-enactment of archetypal situations to the constant presence of scenes on mass media screens.

Mass Media Referents

Images on mass media screens appear as a visual reference point throughout the film. Near the beginning of the film, the boys watch scenes on television of cowboys and Indians battling while racing across the American desert. They watch the television while seated on the back of Tir na nOg whom they've smuggled into their cramped projects apartment by way of a service elevator. When their television is taken away, they seize the opportunity to surreptitiously watch the next door neighbor's television, which is showing scenes from "Butch Cassidy and the Sundance Kid." Later, they sneak into a movie theater after hours; there the three adventurers eat popcorn and watch "Back to the Future," specifically the scene in which the time machine car is chased by Indians on horseback. Boys and horse are framed from behind within the large screen action; Tir na nOg's shadow falls sharply in silhouette across the projected visuals.

Their adventure into the West is precipitated when the authorities seize the horse and a wealthy unscrupulous businessman arranges to buy him illegally. The boys search for him fruitlessly until the day that they go into a video store to find a Western. As they search the shelves for one that they haven't seen yet, the television screen in the background shows scenes of the Grand National Championship and the new wonder horse of the jumping world, National Security. The boys recognize Tir na nOg at once. In the next scene, the police roust Papa Reilly and take him to the police station to question him as to the whereabouts of his sons. They force him to watch a tape of the Grand National which reveals the boys disrupting the proceedings and galloping off on Tir na nOg. Following their escape, Tito and Ossie decide that since they are wanted "horse thieves" with a price on their heads, they will of course make their getaway as Tito says, "To the West! The Wild West!"

The Horse As Visual Icon

The image of the horse operates as the common denominator to the exploration of both myths. The horse as visual icon crosses boundaries of space, time and culture. As a visual symbol, this icon functions to define the parameters of the Western genre in theme and style. Defining stylistic features of the Hollywood Western include long shots and extreme long shots of figures on horseback against the distinctive landscape, whether they are cavalry, posse, cowboys or Indians (Cawelti, 1970, pp. 42-43). (Fig. 1) As Robert Warshow points out, "These are sharply defined acquirements, giving to the figure of the Westerner an apparent moral clarity which corresponds to the clarity of his physical image against his bare landscape; initially, at any rate, the Western movie presents itself as being without mystery, its whole universe comprehended in what we see on the screen" (Warshow, 1962, p. 139). (Fig. 2)

Another distinctive stylistic feature are the chase scenes of posse and bandits, cavalry and Indians and stagecoach and Indians captured in rapid travelling shots: "...those 'cinematic' elements which have long been understood to give the Western theme its special appropriateness for the movies: the wide expanses of land, the free movement of men on horses...land and horses represent the movie's material basis, its sphere of action" (Warshow, 1962, p. 139). At one point in "Into the West" while the boys are riding through the forest, they look up to see riders

Figure 1
Horsemen in Landscape

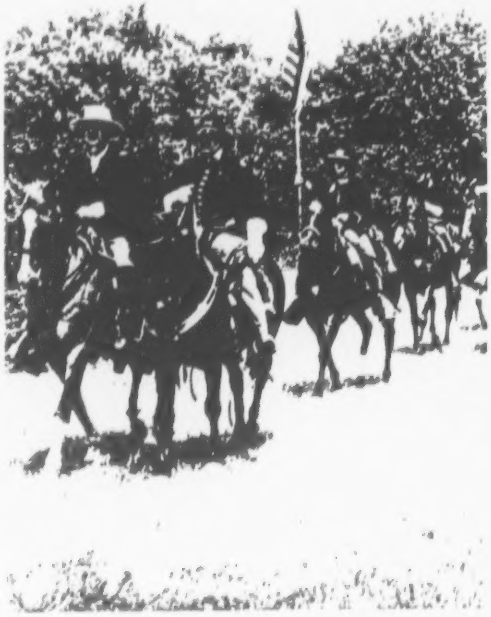
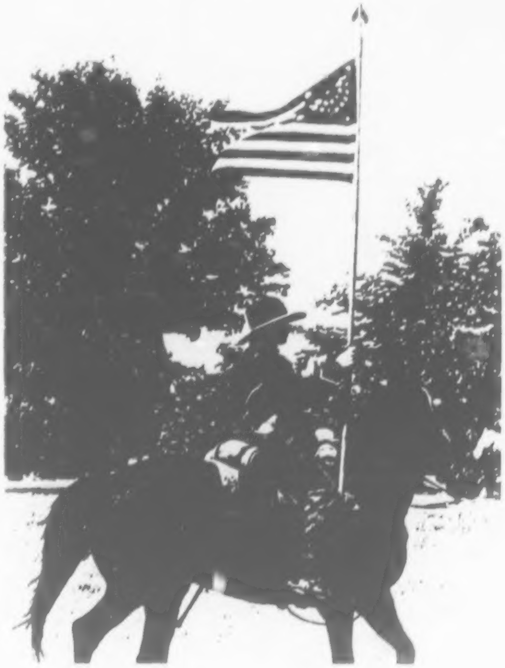


Figure 2
Horses And Men In Movement



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coming over a ridge, silhouetted against the sky. Tito immediately assumes that it's either Indians or a posse and they take off at a dead run, apparently pursued by the other riders. However, the audience and the boys discover their mistake when they realize that they are sharing their eventual hiding place in the underbrush with a fox, the real quarry of that hunt.

Workhorses And Stars

In the depiction of its role in the Western as a draft animal, the horse pulls the buckboard into dusty "one-horse" towns, the stagecoach across the vast expanse of Monument Valley, and the covered wagons of settlers searching for a new life in the West. (Fig. 3) Although he is the magical magnificent star of "Into the West," Tir na nOg is by no means the only horse in the film. The Reilly family belong to an Irish group euphemistically known as the travellers, formerly known as gypsies or tinkers. Even though many of them now live in small trailers, they still buy, sell and own horses which form a living link to the travellers past when they pulled the colorful gypsy carts and wagons (Maslin, 1993). The nomadic gypsy life as opposed to the structured existence of the "settled" people in large part was made possible by and depended upon their horses.

Figure 3
Horses and Driver

In the beginning of the film, Tir na nOg approaches Grandpa who, with his horse-drawn cart, still lives by the old ways. Tir na nOg follows Grandpa and the cart back to a travellers' encampment in the urban wasteland outside the Ballymun projects of the northern Dublin suburbs. All of the other horses at the encampment are obviously of heavier draft stock reflecting such breeds as Belgians, Percherons and Clydesdales. The kids in the encampment clamor to be allowed to ride these animals when they have been unhitched. Tir na nOg's light color and finely chiseled features contrast sharply with the appearance of these other animals. His flashy, spirited movement, head and tail held high, together with his fine conformation indicate his thoroughbred blood. As in the depictions of the Hollywood Western, this visual difference between the animals reveals important thematic distinctions.

Cowboy Identity

The emblem of the horse, a certain kind of horse, represents key elements of the identity of the cowboy, especially the cowboy star. Popular cowboy heroes were double-billed as partners in an inseparable team of horse and man: Tom Mix and Black Jack, Roy Rogers and Trigger, the Lone Ranger and his great horse Silver. These horses all shared the same common characteristics of being fine-blooded, flashy-gaited animals which separated them from the other horses in the films and demonstrated the status of their owners: "...in color, features, 'intelligence' no other horse is the match of Trigger, Silver and company...It almost seems as though the horse enhances the star's qualities as much as the star enhances the horse" (Brauer, 1975, p. 36). At the encampment, Tir na nOg is

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immediately accepted as yet another horse for the children to ride. No one comments about his strikingly different appearance, however, this difference resonates at once with the audience in terms of these themes of cowboy identity.

Traditionally, the traits of power and freedom associated with the depictions of the horse shape the masculine identity of the cowboy. As Parker Tyler notes in "The Horse: Totem Animal of Male Power," the image of the horse has been interpreted as a "power symbol...an extension of the man's personal power, and more specifically, of his sexual power" (Tyler, 1947, p. 112). Thus, in his mastery of the horse the cowboy claims its powers as his own. Throughout the genre, this is nowhere more apparent than in the key scenes which depict the cowboy taming a wild stallion, thereby acquiring its great speed and strength. To name only a very few of the many films in which this mastery of the wild horse occupies a central role in the narrative, these include: "Smoky" (1933, 1946 and 1966 versions), "King of the Wild Horses" (1949), "King of the Stallions" (1942), "King of the Wild Stallions" (1959), "Wild Stallion" (1952), "Wild Fire" (1945), and the films based on the Zane Grey novels such as "Lightning" (1927) and "Wild Horse Mesa" (1925, 1932 and 1947 versions).

Male Rite Of Passage

This bonding process of horse and man frequently represents a rite of passage for young Westerners, an initiation into manhood. The horse functions as a "totem animal in the primitive initiation rite for pubescent boys" (Tyler, 1947, p. 112). Tir na nOg's arrival at the travellers' encampment signals the fact that Papa Reilly, once King of the Travellers, has lost "his gift" with horses. The wild horse will not let Papa approach him; however, he immediately bonds with Ossie (who has "the gift"), allowing the boy to begin riding him at once. This early scene shows the failure of Papa's authority and the beginnings of Ossie's journey. After his wife's death, Papa started drinking, moved into the Dublin slums and became one of the despised "settled" people. Although nominally the head of the family, he can no longer provide for or protect his sons. When the authorities come for Tir na nOg, the horse reacts violently, bucking and kicking holes through the walls. The boys scream again and again for their father to save their horse, but he hides in the bedroom, burying his head in pillows. Finally, once again only Ossie can calm Tir na nOg; he leads him out of the building for the authorities.

On Tir na nOg's back the boys can imagine that they have become cowboys journeying into the Hollywood West. However, a central question which the boys ask at the beginning of the film and again at the end concerns whether the travellers are cowboys or Indians. Although the boys can be cowboys in their imagination, as travellers the Reilly family is also visually associated with and discriminated against as the "Indians" of Ireland. As Gabriel Byrne, the actor who plays Papa Reilly points out, "The way we treat the travellers in Ireland is hypocritical. We say we're a free society in which all are equal, but we practice apartheid. They are the blacks, the Indians of Ireland" (Clarity, 1991, p. 20). The image of the horse provides the common basis for the complex interaction of all three cultures—cowboys, Indians and travellers. The boys face slurs as they lead Tir na nOg through the crowded Dublin streets; Pap's self-esteem fails under constant assault by a bigoted policeman.

Cowboys, Indians and Travellers

The policeman leads the pursuit of Papa to another encampment out in the Irish "wilderness," where he has gone to seek help in tracking his sons. The cop arrives just after Papa joins some dancers around the blazing campfire. Reluctant at first, Papa eventually begins to express his suppressed emotions in the exuberance of lively music and dance. The cop immediately halts the action of the scene (which in its filming recalls many Hollywood scenes of Indian braves dancing around the campfire before an important hunt or an upcoming battle), commanding them to "Stop it! Stop it! Dancing around like animals while your kids are out on the road..." As he departs the campsite after berating them for not providing "proper" homes for their kids, the cops gives orders to his subordinates: "Call me when the animals leave." In the earlier scene at the apartment, this same policeman makes it clear that he sees it as his duty to protect civilized people from such "savages."

As in other Western sagas, the journey of Tito and Ossie on Tir na nOg represents both physical movement across the landscape and spiritual quest (Kitses, 1970). The magical horse carries them over the ground and into the past on several levels—the past of two cultures in myth and legend, the past of their people and the past of their family. Papa, too, must follow them on horseback across the countryside into the wilderness on his journey of redemption. He must return to the old ways to regain his children and his manhood. Tir na nOg disappears back into the waves of the ocean carrying Ossie. His father finally bursts free of the police nets that literally bind his freedom to save his son. But the rescuer's hand that the audience sees Ossie grasp first appears as the horse's flowing tail which then metamorphosizes into his mother's hand. Although initially Ossie appears lifeless when Papa brings him out of the surf, he eventually responds and reports that he has seen his mother, who died giving birth to him. In the final scenes of the film, Papa Reilly returns to the old ways by setting fire to the traveller's cart used by Mary and him, thereby setting her spirit free. As the cart burns, Tir na nOg magically appears within the flames as they reach the end of their journeys.

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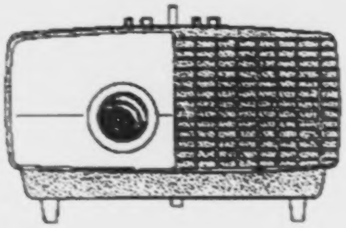
The Development And Demise Of 8 MM Film Loops In America

by Rebecca P. Butler

Abstract

In this paper, I looked historically at the primarily visual medium known as the 8 mm film loop, why and how it developed, and what contributed to its decline. In addition, I studied a variety of these film loops to ascertain whether or not gender representations of the time applied to this medium, and thus to visual and educational technology in general.



Introduction

In the early 1970s, as a college student studying to be a school library media specialist, one of my biggest fears was learning how to use audiovisual hardware and software properly. Because I had grown up in a rural area with little instructional technology in the schools, the thought of a diazo transparency, dry mount press, or laminator sent shivers up and down my spine. Especially anathema to me was the 16 mm projector. I approached this piece of hardware with fear and was soon reduced to sneaking out of the university's hardware demonstration area after ruining yet another practice film. It was then that I discovered a fantastic machine -- the 8 mm film loop (cartridge) projector! Together with its corresponding software, I was suddenly invincible! I could teach with technology! I could pick it up and carry it from room to room, from home to school. And best of all, it made me unafraid. Once I had proven to myself that I could master that one piece of equipment, I now knew that I could learn the others as well. Today, the chances of finding an 8 mm or Super 8 mm projector and/or compatible software are slim. If one is lucky -- or unlucky enough to do so -- they are usually found tucked into a corner of some forgotten closet, covered with dust and spider webs. And yet, at one time this almost wholly visual medium was toted as the library's non print answer to the book. What happened?

8 and Super 8 Film Loops

"Some educators have called the 8 mm cartridge film the 'paperback' of the film format since it is so readily available, so inexpensive (compared with the more common 16 mm films), and so easy to use" (Gerlach and Ely, 1971, p. 347).

While 8 mm films could be in open-reel form, the more popular 8 mm format (in its heyday in the late sixties and early seventies) was the endless film loop (also called the film cartridge). Housed in a cartridge and never removed except for cleaning and/or repair, it was very easy to use. Employed most often for educational or training purposes, the student or teacher simply inserted the cartridge into the projector and turned the machine on. The film, itself, was never touched and never needed to be threaded into the projector. In addition, film loops/cartridge films were easy to store. Available at first in a black and white, silent format -- and later also in color and sound -- the silent, one-concept film loop, proved the most popular. This popularity may have been because of its cost: as little as $8.00 per film (compared to approximately $35.00 for sound film loops), plus the fact that it could be used in a busy classroom with little disruption to the rest of the students (Gerlach and Ely, 1971; Reinhart, 1974; Romiszowski, 1988). Additionally, all 8 mm film loops were three to four minutes in length. There were inconsistencies among film loops, however. The dissimilarities between the Standard (also called the 'regular 8 mm film loop' or just the '8 mm film loop') and Super 8 mm cartridge films was the most prominent example.

Introduced in 1966 by Eastman Kodak (Wittich and Schuller, 1973, p. 452), the Super 8 mm film cartridge was faster than its older counterpart. Speed: 16 frames per second for the standard film loop compared to 18 frames per second for the Super 8 film, made the Super 8 mm film loop more popular. Another difference was in the size of sprocket holes. Because Super 8 mm film reduced the size of the holes, it was able to obtain more room for each picture than was the Standard 8. This resulted in a better picture for Super 8 mm films (Romiszowski, 1988). Indeed the better quality pictures produced by the Super 8s soon put them in the lead for educational uses. As Wittich and Schuller stated in 1973, "More than 100 film producers throughout the world, most of them long experienced in the production of 16mm silent and sound films, are now engaged in producing silent 8mm film cartridges on various subjects.....the subject of 8mm films parallel closely those available in 16mm film" (p. 454).

A Short History.....

"....the portable machine period.....is probably the most important thing that 8 mm has been used for" (Forsdale, 1979).

The 8 mm film loop was first introduced into the United States in the early 1960s. According to C. Louis Forsdale (1979), he was approached by the head of the Horace Mann Lincoln Institute for School Research at Teachers' College, Columbia University and asked if he would be interested in funding to do research on a Japanese 8 mm cartridge loading projector. After looking at the drawings -- there was not yet a prototype for the machine -- Forsdale agreed. Thus for a period of approximately seven years, Forsdale spend half his time investigating the possibilities inherent with 8 mm film. As he later stated to Bill Hugg, who interviewed him as part of the 1970 Educational Communications and Technology (ECT) Oral History Project, "....the basic idea which we had in mind....in those days can best be expressed in the phrase, 'the accessible moving image.' We made it very clear to ourselves that we didn't really care in what form that accessible moving image came, as long as it truly was accessible" (Forsdale, 1979).

To Forsdale and his colleagues, accessibility meant that anyone -- even a young child -- could use the medium. Because film at that time had a lead over television, preliminary thought was that 16 mm cartridge loading projectors might also be developed. A study of three such prototypes soon proved, however, that this was not economically possible. (16 mm cartridges cost more than the film they contained, and needed power within the cartridge to move the film into the projector.) After talking to a number of engineers, Forsdale came to the conclusion that the largest feasible gauge of film that could be placed in a cartridge and moved passively through the projector by claw action alone was the 8 mm. The 8 mm cartridge was also less expensive: fifty cents compared to $25.00 for a 16 mm cartridge (Forsdale, 1979). Thus 8 mm film loops and cartridge projectors began their ascent in the annals of American education. Indeed, as late as 1973, Walt Wittich and Charles Schuller, authors of the fifth edition of Instructional Technology: Its Nature and Use, state that 8 mm film production in the early 1970s is outstripping 16 mm titles and that "With the exception of the cassette tape recorder, the 8mm silent loop cartridge projector is the piece of audiovisual equipment most frequently added to the equipment of schools" (Wittich and Schuller, 1973, p. 473).

Development

Educators in the late sixties and early seventies found that 8 mm film loop cartridges encouraged learning techniques such as self-tutorials, individualized instruction, and small group participation. The simplicity of the 8 mm equipment and materials ensured that almost any age group from about 4 years on could be comfortable in its usage. Its portability, indestructibility (both the hardware and software were hard to damage), and low cost also added to its popularity. In addition, the single concept approach used in the production of most 8 mm cartridges, contributed to alternative learning strategies in

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small group and individualized instruction (Wittich and Schuller, 1973). Also to come out of the 8 mm concept was using visual communication to its best potential. This was a direct result of the *short length* of *silent* 8 mm film cartridges. As Romiszowski (1988, p. 172) says, ".....many instructional situations may actually benefit from very short self-contained presentations and from reduction or indeed total elimination of the audio commentary." Thus, the 8 mm concept strongly promoted a wordless instructional medium.

Demise

In the mid to late seventies, the Standard and Super 8 mm film loops/cartridges began to go into a decline. Reasons included: (1) many schools and libraries had already made an investment in 16 mm equipment; (2) many producers were unwilling to make the shifts necessary to develop 8 mm prints from 16 mm negatives; and (3) the advent of the videocassette made the film loop less versatile and more expensive (Romiszowski, 1988, p. 171). In addition, there were other concerns.

Another problem was that dealing with multiple film loops on exceedingly more difficult parts of the same subject. In such cases, it was not uncommon that only the first loop contained the title and introduction, and additional loops might not have a recapping of the previous film (Iowa State University, n.d., Preparation of less tender beef cuts, Parts 1, 2, and 3; Iowa State University, n.d., Preparation of tender beef cuts, Parts 1, 2, 3, and 4). Such lack of information feasibly caused confusion among users.

Yet another problem was the absence of standards between the various companies which produced Standard and Super 8 mm hardware and software. "It is a higher quality medium, Super 8 ..... than regular 8, but that also stalled the development of the 8 mm movement, for whatever you're going to buy, Super 8, regular 8...." (Forsdale, 1979). The standardization issue also killed a dream of Eastman Kodak's John Florry. Florry's vision was to make thousands of 8 mm prints which could be sold to schools inexpensively. However, "....it's one that never came to pass .... because the laboratories had great difficulty in deciding ..... which standards to go with what kind of a machine" (Forsdale, 1979). Forsdale also stated that he felt people were concerned the 8mm quality was not good enough for a whole class size (unlike 16 mm films and film projectors which worked well with large groups). But, said Forsdale (1979), that factor was ".....more in peoples' heads than it was in terms of the actual capability of the film" (Forsdale, 1979). Forsdale then described "a specially built arc projector," for Super 8 mm film on thirty foot screens that created "beautiful, beautiful images" (Forsdale, 1979). However, the dilemma of which way to go in the film loop market continued, and ultimately, the short life of 8 mm hardware and software drew to a close.

Conclusion: Generalities

Although Standard and Super 8 mm film loops and cartridge projectors were compared to a book in terms of accessibility and were a strong promoter of visual instruction, they remained only a short time on the educational scene.[1] Lack of standardization and versatility, plus a number of economic issues, translated into early extinction for this non-print medium.[1]

Gender Analysis of Studied Super 8 MM Film Loops

Why and How

Why analyze gender issues in an audiovisual medium that has not survived the test of time? Perhaps this is best understood with my dissertation research, Women in Audiovisual Education, 1920-1957: A Discourse Analysis (Butler, 1995), in mind. While doing this research, I became interested in the roles played historically by women and men within the field of audiovisual education. Thus, when I began viewing the many 8 mm film loops used for this study, I found that I was constantly aware of the sex of the characters in each film cartridge. Because all of the film loops I analyzed were silent, it was impossible to attempt a discourse analysis. However, it was possible to visually place where and how men and women were portrayed within the subject content of each film loop.

The film loops used in this study were originally purchased by a university Instructional Media Center. When personnel of this IMC expressed an interest in removing these materials from circulation, I immediately said that I would take the entire film loop collection. As a result, I found myself with eighty-seven 8 mm film loops, some Standard and some Super 8. I next pursued finding the hardware on which to view this software. Only one machine on campus proved able to show any of these films: a silent Super 8 mm cartridge projector. Because parts of my collection were other than Super 8 mm film loops, the study size immediately shrank to sixty-eight cartridges. Those left were all Super 8 mm silent films. My next action was to view each film loop with a number of criteria in mind.

In order to analyze all film loops in a similar manner, I created a short evaluation form which included the following areas:

1) Title
2) Copyright date
3) Publisher/producer
4) Documentation
5) Length
6) Content
7) Black and white or color
8) Gender issues

a) Are the individuals shown male or female?

b) What are they wearing? (i.e., Is what the person wearing affirming his/her sex?)

c) What is each individual doing in the film?

d) If only hands are shown, can an educated "guess" be made as to the sex of the individual? If so, what is the criteria for making this "guess?"

What I Found

Using the above evaluation criteria, several generalizations were made: (1) the majority of the film loops were produced in either the late 1960s or the early 1970s; (2) while a variety of publishers were represented in the collection, most of the film loops came from one of three places: BFA Educational Media, Film Associates, or Iowa State University; (3) the majority had little or no documentation; (4) all loops were between three and four minutes in length; (5) although on a variety of subjects -- such as art, science, biology, outer space, or food preparation -- all cartridges were instructional; (6) while all loops were silent, a few did have text on the screen, thus explaining what the viewer was seeing; and (7) all were in color.

Gender Issues

Almost two-thirds of the film loops contained people. Of these, all were composed of one adult person, excepting for one film loop which contained a group of boys and girls (Herberholz, D. and Filby, L., Puppet stages, n.d.). I determined the sex of each person in the films, when possible, based on his/her physical characteristics, wearing apparel, hair style, and/or jewelry. These determinations were established, given my perceptions of masculine and feminine characteristics in our culture, especially during the time period under study. [The late sixties and early seventies were part of an age where women were demanding, but not always receiving, equality in the work force and society, in general (Baxandall, et al., 1976)]. In some instances, it was not possible to determine the sex of an individual -- for example, when all that could be seen were parts of someone's fingers. However, when possible, observations were made concerning sex and gender assignments. For example, in all food preparation films, the individuals shown were female (Iowa State University, 1971; Iowa State University, 1972). In film loops dealing with science and/or experiments, only males were shown (Adler, 1969; Herbert, 1968; Walters, 1967). And in some film loops, such as Stitchery I and II (n.d.), males were depicted demonstrating the activity -- even though sewing was more likely to be considered a "typical" female occupation (Tierney, 1991, p. 392) in the sixties and seventies. Possibly this assignment of a member of the opposing sex to a gendered role may have been an anomaly, or perhaps it was a reply to women in the seventies who demanded female equality (Solomon, 1985, p. 188). Still another reason may have been a visual extension of a verbal message of the time, which placed men or male terminology in roles in which a specific sex was not determined (Black and Cow-

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ard, 1981). Without interviewing those who wrote and developed these film cartridges, it is impossible to specifically determine why such choices were made.

Conclusion: Gender Issues

Altogether, twenty-two film loops contained a male interacting with the subject environment, and sixteen cartridges consisted of women demonstrating a skill or technique. In addition, one loop contained both girls and boys; seventeen were composed of individuals whose sex I was unable to determine; and twelve had no humans involved in the instructional process. In the studied film loops, it was possible to find a male in a "feminine" role (see above discussion) or in a more neutral role, such as an art teacher/demonstrator. However, while women, too, were portrayed in gendered roles such as cooking or meat cutting, as well as in neutral roles (for example collage construction), no women were found in subject areas seen as masculine (scientist, etc.). These perceptions reflect the times in which the studied film loops were created and produced: a era where politically the gender gap was beginning to, but had not yet declined (Hartman, 1989, p. 72).

Conclusion

Regardless of the fact that 8 mm film loops and projectors had a short life span, their existence on the audiovisual scene makes them a viable part of our visual literacy and educational technology history. Gender issues within this medium provide us with another view on a past era. As C. Louis Forsdale (1979), one of the fathers of the American 8 mm film loop concept said, "we....believed....that if the moving image was indeed accessible to everybody: child, teacher, housewife, anybody, that it would then come closer to the role that the book has played, and the book has played its role in large measure....because it is accessible."

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[1] By the time C. Louis Forsdale was interviewed for the ECT oral history tapes in 1979, 8 mm film loops and projectors were no longer a constant in education. Instead, growth in this format had taken a new turn: away from the K-12 curriculum and towards hard core pornography: "By the way, fascinating little side note on this thing. I don't have any figures on this but I would be willing to guess that maybe the greatest market for Super 8 mm distribution in this country is hard core pornography. And I literally mean that. The pornographic field, the sales stores, have gone in the direction of 8 mm and Super 8 mm, and from what I gather their turnover is very large indeed" (Forsdale, 1979).

Women's History In Visual And Audiovisual Education, Where And How To Find It

by Rebecca P. Butler

Abstract

The purpose of this paper is to (1) briefly describe dissertation research covering the history of women in visual and audiovisual education, 1920-1957; (2) convey the manner in which an historical methodology may be reached; and (3) trace sources for such research. Special emphasis is on where, how, and why visual literacy and educational technology historians can and should make use of the Association for Educational Communications and Technology Archives.

Introduction

Non-print media use in U.S. public schools began as early as 1905. It was during this year that St. Louis, Missouri, assistant school superintendent, Carl Rathmann purchased exhibits from the 1904 Louisiana Purchase Exposition (World's Fair) for use with the school children of his city. Overwhelmed with sets of lantern slides, stereoscopic views, and realia, he created one of America's first audiovisual pioneers: Amelia Meissner, an elementary school teacher, when he placed her in charge of the collection (Golterman, 1976). From this inauspicious beginning, came visual education, audiovisual education, and educational technology. Another pioneering effort in the field occurred in 1923, when Anna Verona Dorris and eighteen others penned the first visual education textbook to be published in the United States: Visual Instruction: Course of Study for the Elementary Schools, Including the Kindergarten and First Six Grades. With this modest textbook, a variety of texts dealing with both visual and audio education began changing the way educators across the nation viewed instruction in K-12 schools and higher academia. Who were these women mentioned above? Why is it that most of us have never heard their names before? When we think of pioneers in audiovisual education, for what reasons do mostly male names come to mind? How and where can we find out more about both the male and female founders of our field?

Dissertation Research

After asking myself the above questions and more, I determined that the purpose of my dissertation research would be to document the creation of subjects within the dominant discourses of audiovisual education, 1920-1957, especially the role of United States' women during that time period. (I chose this specific set of dates because of its proximity to the beginnings of visual and audio education, as well as its closeness to some of the greatest growth periods in the history of the field: World War II[1] and Sputnik.[2]) As such, I reviewed representative samples of oral history tapes of founders in the field[3] and textbooks authored by various audiovisual pioneers to ascertain the manner in which these texts constructed their subjects (positioned their readers). I also assessed critically the discourses running through audiovisual education, 1920-1957; and defined the formation of men and women as subjects in the early texts and dominant organizations within the field. Studying the various histories in the context of the time in which they occurred, I established that the dominant perception of women in audiovisual education, 1920-1957, was that of helpmate to male audiovisual specialists, BUT alternative discourses with a more humanistic bent ran as sub-texts through much of this. These alternative discourses provided readers with choices -- they were invited to view the world in more equitable terms.

Historical Methodology

The most prominent type of historical methodology is descriptive history; a recording of past events (Gray, et al., 1964). However, such a traditional history does not always fit the subject matter or the research materials available.

In such instances, it is necessary to develop alternative research strategies. Such is the case for my dissertation research: "Women in Audiovisual Education, 1920-1957: A Discourse Analysis."

There is no standard methodology for a discourse analysis of historical audiovisual texts. Therefore, working concepts of text, reader, author, subjectivity, sex, and gender were drawn from a number of sources: social reader theories ala Stanley Fish;[4] critical feminism via Judith Butler,[5] Maria Black and Rosalind Coward[6] and Sandra Harding;[7] and discourse as informed by post-structural concepts.[8] (These theoretical constructs have similar and non-competing epistemologies: belief in the social construction of knowledge and relationships.) Rhetorical findings were positioned, via discourse analysis, in the discourses which produced them. Thus, the methodology was a discourse analysis of selected audiovisual textbooks and audio-tapes of founders in the audiovisual field, 1920-1957.

Given this discourse analysis, I chose to analyze early audiovisual texts (textbooks and oral history audio tapes) to ascertain the rhetorical direction the authors/founders took in shaping the base of knowledge constituting audiovisual education and gender/sex equity issues within the field. I explored the authors' discourses to discover which ideas and concepts were included or excluded from their writings and conversations, examined how the authors spoke and with what authority, described the discourses they offer their readers, and discussed how these authors construct their readers/listeners through the discourses they use.

For the early audiovisual textbooks and manuals section, authors were selected if they were in more than one of a number of related areas, including: audiovisual professional periodicals (1920-1957); early audiovisual conference programs, proceedings, and publications; on AECT oral history tapes; and/or if referenced or quoted in more than one early audiovisual education textbook. Textbook sampling procedures included looking for the author's voice and tone in areas where I felt they would be most evident: prefaces and forwards (where authors often reveal why they wrote the text, thus revealing their voice); chapters one and two (which are introductory and lay foundations, also disclosing voice); and summaries and conclusions. After examining early textbooks and manuals, I turned to the oral histories.

Similar criteria to that used for the audiovisual textbooks and manuals discourse analysis decided which of the oral history tapes of visual, audiovisual, and educational technology founders would be analyzed. In total, twenty-three tapes were perused: twenty male and three female. These were studied to understand the construction of men and women in audiovisual education, 1920-1957, as positioned by the interviewed founders. This methodology ascertained the rhetorical direction the authors and founders took in shaping the base of knowledge constituting audiovisual education and gender and sex equity issues within the field during the first half of the twentieth century.

AECT Archives

Prominent in information provision for the above dissertation discussion are the AECT Archives, housed with the National Public Broadcasting Archives at the University of Maryland, College Park, Maryland. Types of items currently found in the AECT Archives include: conference reports, audiovisual guides, software and hardware manuals, film catalogs, private correspondence to and from founders in the field, and reel-to-reel oral history tapes (Conners, 1996). The AECT Archives can be accessed by contacting: Thomas Connors, Curator, National Public Broadcasting Archives, Hornbake Library, University of Maryland at College Park, College Park, Maryland 20742. They are open to all those interested in historical research in the field(s) of visual literacy and educational technology.

Conclusion

Dissertation Research

The dissertation study, "Women in Audiovisual Education, 1920-1957: A Discourse Analysis," analyzed the creation of subjects within the dominant discourse of audiovisual education, 1920-1957, and the role of women in particular. Authors' discourses were explored to uncover which ideas and concepts were included and/or excluded from their writings and conversations. Because there is no standard methodology for a discourse analysis of historical audiovisual texts, working concepts of text, reader, author, subjectivity, sex, and gender were drawn from a number of sources: social reader theories, critical feminism, and discourse as informed by post-structural concepts. In addition, rhetorical findings were positioned, via discourse analysis, in the discourses which produced them. This study established that the dominant perception of women in audiovisual education, 1920-1957, was that of helpmate to (male) audiovisual specialists. Factors which created and fed such a perception were the results of, among other things, the two world wars, the military establishment, the corporate world, and the federal government (for the most part, all patriarchal/male-dominated institutions). Although societal and cultural influences of the 1800s were changing in the first half of the twentieth century, societal perceptions still established that men were providers while women cared for home and family. However, within this environment, existed alternative discourses influenced by Edgar Dale, John Dewey, and the child-centered learning theory movement. These alternate discourses provided their readers with choices; they were invited to view the world in more equitable terms. Such perceptions, and the discourses influenced by them, affected how both sexes were viewed within audiovisual education, 1920-1957 (Butler, 1995).

AECT Archives

The Association for Educational Communications and Technology Archives materials' collection, ranging from oral history tapes to conference proceedings to the private correspondence of audiovisual education founders, provided a wide variety of resources instrumental to my dissertation research. For current and future visual literacy and educational technology historians, the AECT Archives represents a major information provision source.

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[1] During World War II, the field of audiovisual education boomed with the realization that training films were a quick and easy way to instruct thousands of men and women in both the armed forces and industry (Butler, 1995).

[2] Sputnik created a mass concern in the United States that Soviet technology had defeated the

American education system. The National Defense Education Act (NDEA), which provided monies to introduce audiovisual materials into the educational curriculum, was a direct result of Sputnik (Craver, 1986; Kliebard, 1987; National Defense Education act, 1958).

[3] These tapes came from two sources: Department of Audio Visual Instruction (DAVI) oral histories commissioned in the 1950s and Association for Educational Communications and Technology (AECT) oral histories of DAVI and AECT pioneers taped in the 1970s (Conners, 1996; Heinich, 1994).

[4] Stanley Fish's earlier works promote interpretive strategies -- a social reader theory which postulates that a community of readers may share textual interpretations based on discursive influences (Attridge, et al., 1987; DeVaney, 1994).

[5] Judith Butler theorizes that sex and gender are both social and cultural constructions and that these constructions are formed in discourse (Butler, 1993, p. 10).

[6] Black and Coward postulate that discourses create and cultivate the positioning of men and women in a society (Cameron, 1990, p. 124-132).

[7] Sandra Harding's feminist standpoint theory promotes knowledge as socially constructed and focuses on gender differences (Harding, 1991).

[8] Bove describes discourse as invisible systems of thought which operate at a linguistic level to produce and regulate knowledge. In addition, he argues that all communications are discourse specific (Bove, 1992).

Visual Productions And Student Learning

by Marilyn Bazeli

Abstract

When students become actively involved in technology productions they develop learning skills, communication skills, and visual analysis skills, all of which are applied to real-life learning within the classroom curriculum. Students participate in the planning, production, and evaluation of production projects, which proves to be motivating for the students and allows the teacher and students to work together personally and collaboratively. This is a different way for educators to think of classroom structure. Some ideas are presented for student visual productions that are integrated directly into classroom curricular areas.

Introduction

Many teachers want to use technology in their classrooms. However, designing classroom activities involving various media is time-consuming and busy teachers rarely have extra time for additional planning. When students become a part of the planning and implementation of technology into the classroom, the burden is lifted from the teachers and the learning process becomes collaborative, with the teacher assuming the role of facilitator rather than disseminator of information. Further, as students are actively involved in technology productions, they gain critical thinking and problem-solving skills along with curriculur learning.

Psychologists have long investigated the learning process in humans, and the following have been found to be important elements in that learning process:

- Clear statement of learning objectives
- Organization of content
- Participation
- Practice and repetition
- Feedback
- Application
- Motivation

(Bell-Gredler, 1986; Kemp & Smellie, 1994) When students are actively involved in their own learning, through technology productions, each of those elements of learning is addressed directly (Bazeli & Heintz, 1997). Students help in determining clear objectives of the project, and in the organization of content. They are direct participants in the project, dealing constantly with practice, repetition and feedback. As they apply their learning to a real-life technology production of which they can be proud, their learning is not only enhanced but they also become highly motivated.

In our present visual world, it is more necessary than ever to help students to be able to apply critical thinking skills to all of the visuals they are bombarded with on a daily basis. Visual literacy is quickly becoming as necessary as verbal literacy. Engaging students in producing various kinds of visuals provides them with many opportunities to analyze visuals and, even more importantly, to apply problem-soving and critical thinking skills to real situations.

Communication skills have been recognized to be extremely important, especially in the coming century. Corporations as well as educational institutions have stressed the need for more effective communication among employees and students. As students become involved in technology production activities, they develop cooperative skills and communication skills because they do not work alone on the activities. Either they are working in cooperative groups with other students, or they are working with the teacher on a one-to-one basis to plan and complete the production activity. Further, problems are solved in a collaborative way and in a real-world setting, as students find ways to solve planning and production problems.

Students need to be actively involved in their own learning experiences. When they are a part of the planning, researching, producing, and evaluating of technology projects, they become highly involved in their own cooperative, creative, integrated, and authentic learning. Additionally, the teacher's time can be focused more on personal involvement and facilitation of learning, rather than on planning and evaluation.

There are more and more books and articles appearing, from a variety of publishers, focusing on the use of technology in the classroom. Many of those books deal with technology as a learning tool, but do not involve students in technology productions. Those that do, however, often utilize only the computer. Research on the Internet, and multi-media productions are wonderful, but have some drawbacks. Too often, the instruction centers on the technology itself, and not on the curricular applications of the technology. For example, if we want to teach students to create multi-media presentations, then that is goal. However, if we want to teach students to organize their learning into a visible and presentable form, using even simple forms of technology, then their *learning* is the goal. The type of technology employed is not as important as the curricular applications of technology productions. If we teach research skills using the Internet, for example, we need to follow up with engaging students in some type of demonstration of what they have learned. Changing the way classroom instruction is organized, so that students are involved in and demonstrate their own learning, is the important thing. Engaging students in authentic, real-life experiences, building on the classroom curriculum, can be effectively accomplished with technology productions of all kinds.

Practical Ideas for Visual Productions by Students

Some ideas for classroom activities centering around specific curricular applications will be presented here (Bazeli & Heintz, 1997). Each of the activities provides opportunity for students to link their classroom learning with a visual presentation of their learning in a real-life setting.

Photography

Before beginning any of the activities discussed here, a disussion of guidelines for creating effective photographs should occur. Guidelines could include such things as eliminating extra and unnecessary elements in the background, placing the central object off-center, using foreground objects to provide depth, and so on.

Reading

As new vocabulary words are presented, students select or are assigned specific vocabulary words to work with. Each student (or group of students) then identifies some type of visual that would clearly define their words. The discussion and selection process provides experience with visual literacy, as each word is interpreted visually. Students use either a traditional camera with film or a digital camera to take the picture of the selected visuals to define their words. Finished photographs can be placed in a classroom dictionary, with definitions printed beside each, or on a classroom bulletin board.

Science

Students can create visual weather records by photographing weather conditions at a specific time each day or once each week for a designated time period. These would be assembled either in a book or a chart, to visually show changes in weather. Alternate activities could be to have groups of students focus on specific aspects of weather, such as cloud formations, drifts in snow caused by wind patterns, rain run-off locations, etc. Over time, and combined with weather statistics in the newspaper, students would be able to apply thinking skills regarding impact of weather on our daily environment, weather forecasting cues, effects of a falling barometer, and so on.

Social Studies

Students could take pictures of various buildings, places, people, events in their community. Different groups of students would focus on a different components of the community, and carefully select and decide upon the objects or people to photograph. The decision process would develop the research skills of the students as they find out about their chosen component of the community, and would

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also develop their critical thinking skills as they decide upon specific visuals to use in order to effectively depict the component. For example, students working on buildings in the community would need to research architecture types, dates of construction, etc., and then select those buildings which would depict a variety of architectural and historical representations in the community. The photographs would be mounted on poster board and appropriately labeled or described. As each group of students completes their display, the many elements making up the community would be evident.

Organizational Visuals

Visuals of all sorts, from graphic organizers to graphs, can be produced by students to give meaning to their learning experience, and provide an effective way to present their learning. Following are some ideas for students to be involved in producing organizational visuals.

Word Sorts (all curricular areas)

Word Sorts is an activity involving visual sorting of vocabulary within a familiar and comfortable group setting. Olle (1994) states that students use this process to rehearse new vocabulary, to discuss with peers various classifications of words, and to develop thinking through defining the words. Students work collaboratively to define given vocabulary words, to sort the words into categories, and to practice pronouncing each word. This provides a hands-on, visual experience with new words.

Language Arts

Story mapping is a visual way to understand how a story is organized. This strategy can involve the use of both words and pictures. Students select main ideas, supporting details, and characters, and then organize them into a visual map. This is a very effective tool for developing comprehension. It can be applied to other curricular areas, also. For example, as students read new material in science, they can also use a mapping technique to organize the information visually. This is often more effective than traditional note-taking because of the added visual element to aid in encoding information into long-term memory.

Video

Student television productions in various curricular areas help to develop the skill of anlyzing television and also aid in cognitive development within specific curricular areas. As students think about what to present visually and auditorially in their television production, they also are developing comprehension and analysis skills regarding the topic (Bazeli & Heintz, 1997).

Television Documentary (all curricular areas)

Students plan and produce a short television program about some aspect of a topic being studied in class. For example, if the class is studying animals, students could select birds or small mammals of their geographic area as a subtopic to investigate. Students would find out about that subtopic (through reseach in books, Internet, magazines, etc.), and then videotape real birds or mammals found on a field trip in the woods. They could also interview on video local people who are knowledgeable about the selected subtopic.

Language Arts

Students write an original story, create illustrations for the story, and read the story while someone holds the illustrations in front of a video camera. Because students are off-camera and using a microphone, they can focus on reading their story instead of looking at the camera, and can thus concentrate on such things as vocal expression, tone of voice, enunciation, and so on. The illustrations they created (with a computer or drawn by hand) would keep the attention of the listeners and enhance the comprehension of the story.

Health

Students, working in groups, write a script for a commercial to promote or sell a food that is good for them, but one that they find undesirable (such as cauliflower, broccoli, or liver). The students would first do research to find the benefits of their selected food, and use those findings to write an effective commercial promoting the food, utilizing persuasive writing techniques. After assembling any necessary props and rehearsing the script, the commercial is then videotaped. The completed videotape could be used by students in other health classes to develop nutritional knowledge. Limiting students to a specified time limit (30 or 60 seconds) requires the development of precise and concise scriptwriting skills.

Computers

Students need to view computers as a tool for learning, and to investigate the many applications of computers in organizing and displaying information. Unfortunately, the computer is often a separate entity, not an integrated part of the curricular areas of a school. The activities presented here involve the students in computer activities that are directly related to classroom study.

Math

In this activity, students use a simple spreadsheet to calculate their grade average. An understanding of the formula for computing average is necessary, and then students apply that to the concept of a spreadsheet. Students can predict changes in averages if one score were to change, or a new score added. Students can also prepare graphs to represent averages calculated each week.

Language Arts

Each student enters information about him/herself into a database. Information such as number of brothers or sisters, pets, favorite foods, favorite TV shows, favorite books, etc., could be included. Students learn to do searches to find all students who have dogs as pets, or who like to read. Not only do students become better acquainted with each other, but they learn in a concrete way how to manage a data base. Finally, students read the data, and then use data to write a news report about their classmates, using the word-processing capabilities of the computer. For example, one student might write about the pets of the students, another might write about the favorite foods of their classmates. Graphs could also be constructed to visually show the information on the data base.

Sound/Slide Productions

Students can use several media combined to express information. The activities described here involve the combination of slides and recorded sound. However, any of these activities could easily be converted to computer multi-media productions involving videodisc images or scanned images, combined with a computer created text. The media used are not important; what is important is *how* they are used to engage students in their own learning.

Language Arts

The teacher selects a groups of slides, either on a particular topic or completely unrelated. Students write a script for those slides, selecting an appropriate objective, and arranging the slides into a logical sequence. Students can work individually or in cooperative groups. Upon completion of the scriptwriting, students rehearse the narration, and then record it. The students share their completed sound/slide presentation and discuss the various interpretations of the set of slides. Implications of varied interpretations or perceptions of everyday visuals, such as news, TV shows, should also be discussed.

Social Studies

Students create a visual presentation of the community by combining slides made of old photographs from the past with new slides or video from the present. Students select a theme to represent visually, such as schools in the community, or businesses. Old photographs would be located showing the selected theme. Students make slides of the photographs by taking pictures using a copystand. Then, new slides or videos are taken to represent the theme in present time. The old and new would be combined, with appropriate narration written.

Conclusion

The activities described here are just a few that could be designed to involve students actively in technology productions that directly relate to curricular areas (Bazeli &

Heintz, 1997). As students work together to produce a visual representation of information gathered in a specific curricular area, they not only use the technology as a learning tool but they also demonstrate comprehension of the subject studied. Helping students learn how to learn, and to love learning is a goal of schools; we want our students to become life-long learners, with a knowledge of the tools to aid them. One way to do that is to change the way we structure learning in the classroom, engaging students in the planning, researching, and demonstrating of their learning. As students feel ownership and accountability for their learning, they become more motivated. Technology productions by students enpower them to take some control over their own learning experiences, and provide them with real-life, relevant learning experiences. Finally, the collaboration between teacher and student as such productions are developed allows the teacher to be a true facilitator of learning and enthusiastic guide for life-long learning skills.

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A Cartographic Interpretation of Visual Literacy: An Historical Perspective

by Cindy L. Kovalik and Kim Lambdin

Abstract

This paper presents findings from an historical investigation of visual literacy. The unique aspect of this historical inquiry was that the approach relied on the marriage of two disciplines, geography and history, both of which involve the study of change over time. Maps, the interpretation of data by cartographers, tend to provide a foundational context that can illuminate and establish connections between the past and present world. Using a variety of sources, historical aspects of visual literacy have been mapped using a geographic information system (GIS). By overlaying a map depicting one data source with a map depicting another data source, relationships between the two data sources may become more apparent than if the two data sources were described solely in a written format.

Introduction

Visual literacy is an eclectic blend of disciplines including linguistics, philosophy, art (Jonassen & Fork, 1976), semantics, and the scientific investigation of vision. Tracing the development and history of visual literacy from a historical perspective encourages a mingling of diverse approaches that attempt to characterize the impact and importance of past research, seminal writings, and practical implementations in an effort to better grasp the diffuse nature of visual literacy.

Important to this effort is placing the development and growth of visual literacy in a context. Multiple constituents have contributed, and continue to contribute, to the field of visual literacy. Identifying categories that impinge on a contextual representation of visual literacy was a first step in an effort to look at visual literacy from a historical perspective.

A second step was to identify a vehicle through which to convey historical data. The goal was to use a visual representation of historical data rather than a verbal description. The multifunctionality of maps led us to choose a mapping strategy for graphically representing the data we collected.

Geography provides, a way to join individual data elements within common boundaries. Blending historical data with geographic reference points provides a way of looking at information that may generate new questions and new perspectives. Interrelationships may become more apparent, or less so.

The ability to create maps of historical data has been made more accessible through the use of technology, specifically geographic information systems (GIS). Such systems are capable of acquiring, storing, manipulating, and analyzing large amounts of data and presenting them in the form of digital or paper maps. The visualization and consequent analysis of historical data through maps offers a unique perspective on information that, if viewed solely tabularly or through a trail of words, may remain obscure.

Investigative Strategy

Recognizing that fields of research and study such as visual literacy do not exist in isolation, but rather are intertwined with existing systems, sources were chosen to provide a representative sampling of data. These varied data sources place visual literacy within a contextual framework. the purpose of this approach was to determine if geographic location provides a visual basis for formulating questions about relationships and connections between and among the data sources. Included in the historical investigation were: a time line of seminal works in visual literacy; historical archival research through primary source data from one public school educator who has concentrated on improving perception in children; identification of governmental influence on visual literacy through funded educational programs; a sampling of scientific research related to vision and perception; the collection and preservation of a media format; and current non-school programs concerned with visual literacy.

Historical investigations may benefit from the inclusion of a rich diversity of data sources. Each source provides not only its own unique perspective of the area under study, but also contributes to a more comprehensive delineation of a particular time in history as each data source is juxtaposed with other data sources.

The mid-1960's to the mid- to late-1970's served as the focal point for our investigation. Limiting the timeframe enabled a cohesive structure to emerge. This emergent structure served as the background upon which successive layers of data were placed. The next sections briefly describe each data source.

Time Line of Seminal Works

Plotting historically relevant events against the backdrop of seminal works may reveal relationships, highlight clusters of events, and illuminate key theoretical aspects in the evolution of visual literacy.

This section encapsulates the work of Debes and Williams (1978) and Hortin (1994) on the theoretical underpinnings of visual literacy. The early history of visual literacy is designed to provide a backdrop from which to explore the *Zeitgeist* surrounding the development of visual literacy.

Before visual literacy was actually a term, magazines such as *Life* and *Look*, published in the 1950's and 1960's, played key roles in telling a story or delivering a message through photographic essays. The real impetus, however, for gaining an understanding of visual literacy emerges as television moves into the American home in the mid- to late-1950's. Visual images bombard the American public as never before. Concern over children being passive receivers of information helps focus attention on the need for visual literacy skills (Jonassen & Fork, 1976).

For those immersed in the creation and use of visual images, such as Jack Debes of the Kodak Company, such concern over the need to expose children to visual literacy skills was translated into the formation of a new 4H program. First announced in 1961, the study of photography through the auspices of 4H has since evolved into the largest program of photographic instruction in the world (Debes & Williams, 1978).

In 1962, Paul Wendt (1962) postulates that the meaning of pictures lies in what the viewer brings to them. This begins to focus study in visual literacy on the individual's perception of the message that is being conveyed visually.

During the mid-1960's, Jack Debes began work on slide shows created for educational purposes. These became known as The Photo Story Discovery Sets and were primarily used to educate school children about photography and the interpretation of photographs. Jack Debes and Kodak were also instrumental in the publication of a magazine called *Visuals are a Language* that encouraged educators to think about the impact and meaning of visuals in education (Debes & Williams, 1978).

Rudolph Arnheim's *Toward a psychology of art* was published in 1967 (Arnheim, 1967). Arnheim's thesis asserted that reasoning is not limited to the manipulation of words and numbers. Arnheim was concerned that education tended to overemphasize verbal language while downplaying the significance of visual "language" on creativity and learning.

The growing interest in the connection between visual literacy and education led to the formation of a visual literacy association in 1968. The first conference of the visual literacy association was held in 1969 in Rochester, New York. Proceedings of the first conference were subsequently published in 1970 (Debes & Williams).

In this same time period, Noam Chomsky wrote *Language and mind* (Chomsky, 1968) which explores the concept of a universal grammar that constitutes the study of the nature of human intellectual capacities. Arnheim, in 1969, authored *Visual thinking* (Arnheim, 1969) in which he contends that all thinking is basically perceptual in nature. For Arnheim, perception is a cognitive ability.

Colin Murray Turbayne, an Australian philosopher, wrote *The myth of metaphor* in 1970 (Turbayne, 1970). This work had a tremendous influence on the development of visual literacy theory. Turbayne (1970) posits that man uses metaphor to illustrate ideas, control thoughts, and induce behavior. Turbayne (1970) defines metaphor as the pretense that something is the case when it is not.

The 1970's saw the inception of the *Visual Literacy Newsletter* and the establishment of the "Rochester School," where Jack Debes, Clarence Williams and Colin Turbayne worked together to clarify and define the theoretical foundations of visual literacy (Debes & Williams, 1978).

The mid-1970's see further refinement of visual literacy precepts. D. A. Dondis' *A primer of visual literacy* is published in which differences between visual and verbal language are identified (Dondis, 1973). P. A. Gozemba (1975) hypothesizes that Chomsky's universal grammar ideas are tied to the theoretical constructs of visual literacy and that the study of visual literacy may yield data on relationships between speaking, writing, visualizing, and learning.

A program aimed at learning from media and pictures was produced by the New York State Department of Education in 1976 (Hortin, 1994). In that same year, E. B. Feldman (1976) lists visual literacy implications for education:

- there is a language of images and it can be learned;
- much of what we know about the world has been learned through visual images without benefit of formal instruction; and
- several disciplines that study art constitute ways of reading visual language.

According to Feldman (1976), the key is whether perception of visual images can be regarded as critical thinking rather than programmed responses.

In 1977, Harry S. Broudy (1977), an art educator, argues for the inclusion of aesthetic education in schools. M. Fleming and W. H. Levie publish *Instructional message design: Principles from the behavioral sciences* in 1978 (Fleming & Levie, 1978) and J. E. Hill (1978) calls for more cooperation between communication theorists and instructional technologists.

Also during 1978 J. Flory (1978) identifies four primary concepts that support the study of visual literacy:

1. a visual language exists;
2. people can and do think visually;
3. people can and do learn visually; and
4. people can and should express themselves visually.

This abbreviated identification of seminal works in visual literacy provides a framework upon which to place other aspects of visual literacy that were occurring during this time. The work of Dr. Henry Ray (Ray, 1965; Ray, 1967; Ray, 1971) provides a starting point in this endeavor.

Archival Research

Kent State University is in the process of acquiring Dr. Henry Ray's papers for the Kent State University archival collection. Already in the collection are files of correspondence dating from the mid-1960's through the mid-1970's. Requests for information and advice came to Dr. Ray not only from within the United States, but also from around the world, including India, Japan, South Africa, England, Israel, and Australia. Notable in the collection is correspondence with Rudolph Arnheim, who visited with Dr. Ray in the unique learning environment Dr. Ray pioneered, the Special Experience Room at McDonald Elementary School in Warminster, Pennsylvania.

Henry Ray graduated from Kent State College, (now Kent State University) Kent, Ohio, with a 2-year teaching diploma in 1934. In 1945 he received his bachelor's degree from Kent. By 1955, Dr. Ray had earned his doctorate from Teachers College, Columbia University.

After receiving his doctorate, Dr. Ray became Assistant Superintendent of Schools in Bucks County, Pennsylvania and eventually moved to the position of Director of Teaching and Learning Resources for the Centennial School District in Warminster, Pennsylvania.

Dr. Ray's career and life have centered on his love and enthusiasm for perception and what he calls "relational thinking." As Dr. Ray (personal communication, June 3, 1996) says, "I feel that if the kids are going to be motivated and triggered to learn, or to [participate] in the learning experience, they ought to have a setting [where] they could do this and that's why I wanted a special experience room."

The Special Experience Room (now called The Dr. Henry Ray Special Experience Room) engulfs children with images and sound. It is a domed structure, the center hub of the McDonald Elementary School, built with governmental grant money in 1968.

In the mid-1960's the Centennial school district needed a new school to accommodate its growing population. The local superintendent asked Dr. Ray, "What would you like to see in this new school?" Dr. Ray responded by saying, "I would like a room where I could surround the kids with vision and sound and color..." (personal communication, June 3, 1996).

Thus was born the Special Experience Room. Central to the programs conducted in the Special Experience Room are numerous slide sets assembled by Dr. Ray that focus on teaching the art of perception. Consisting almost entirely of photographs taken by Dr. Ray, the programs range from dinosaurs to the zoo to spring skies to scarecrows.

Throughout the late 1960's and 1970's Dr. Ray published a number of articles about his work with students in the Special Experience Room. Perception, creativity, and the utilization of media in education have been the major themes in his writings. His articles appeared in journals such as *Audiovisual Instruction* (Ray, 1965), *NEA Journal* (Ray, 1967), and *Childhood Education* (Ray, 1971).

While he was actively involved in the operation of the Special Experience Room, Dr. Ray

- was sought out as a speaker at numerous educational conferences throughout the country;
- served as a consultant to school districts as far away as Alabama;
- was asked to be on a U.S. government project headquartered in New Mexico on improving visual perception in young deaf children; and
- spent almost two years in Afghanistan as an educational consultant.

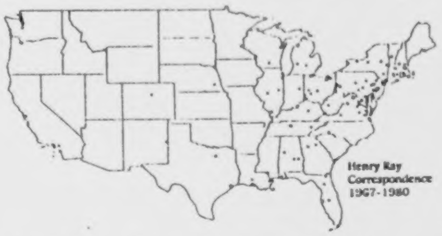
An accomplished artist in several media, Dr. Ray has had

- his own radio program in which he played the piano;
- two original fingerpaintings included in a book by Virginia Betts on fingerpainting (Betts, 1968); and
- a one-man photography exhibit at a college in New Jersey.

And Dr. Ray is still actively creating visual experiences for children through his photography and other artistic endeavors at the age of eighty-seven!

It is the correspondence portion of Dr. Ray's papers that furnished mapable data for this historical look at visual literacy. The location of each correspondence was plotted on a map of the United States. The resultant map provides a geographic interpretation of Dr. Ray's possible influence in the area of visual perception (see Figure 1).

Figure 1
Dr. Henry Ray Correspondence
1967-1975



Governmental Influence

Governmental funding can provide the means to implement programs that would be virtually impossible to attempt without sizable monetary grants. Title III of the Elementary and Secondary Education Act awarded money in 1968 to the Warminster County Schools, for example, that was used to build and maintain the Special Experience Room mentioned above.

Title III of ESEA was originally established under the rubric of Projects to

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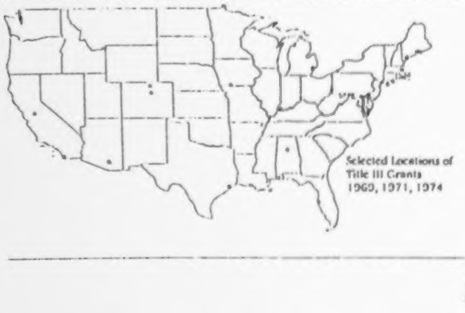
Advance Creativity in Education in 1965. Public law 89-10, frequently referred to as PACE, funded local educational agencies for "planning imaginative solutions to educational problems, for demonstrating worthwhile innovations in educational practice through exemplary programs, and for supplementing existing programs and facilities through model centers that provide services and/or materials" (Ohio Department of Education, 1967). In one sense, Title III money was aimed at narrowing the gap between educational research and educational practice.

Title III money has been distributed to programs having a visual literacy component or relationship in Alabama (Hawke, 1974), Minnesota (Minneapolis Public Schools, 1972), Massachusetts (Ziegler & Schulz, 1965), Michigan (McClafferty, 1969), Oklahoma (PACEReport, 1968), California (1968), and Nebraska (Wayne-Carroll Public Schools, 1974).

While it is difficult to identify every program funded through Title III that had a visual literacy component, government publications occasionally included titles and brief descriptions of exemplary programs (Program Dissemination Section, 1969a; Program Dissemination Section, 1969b; Time for a progress report: ESEA Title III, 1971). From these descriptions it was possible to cull a handful of additional Title III programs that made mention of media, art, perception, and the like.

Though few in number, the Title III programs thus identified were mapped as shown in Figure 2.

Figure 2
Locations of Selected Title III Grants
1969, 1971, 1974

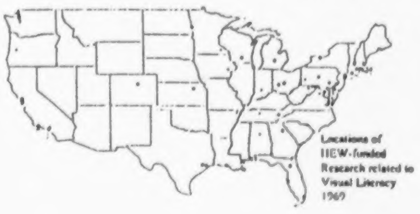


Scientific Research Related to Vision and Perception

Government funding also extends to the research community as a whole. The scientific study of vision, ranging from eye movement to color sensitivity to perceptual coding, impacts the field of visual literacy. The strong relationship between scientific research and growth in the field of visual literacy prompted a preliminary documentation of scientific research supported by the U.S. Department of Health, Education and Welfare (HEW).

Information from one fiscal year (1969) indexed as research related to education, audio-visual aids; eye, vision, optical illusion; eye, visual feedback; and eye, visual perception were tabulated. These index categories yielded approximately eight-five individual research activities. The map in Figure 3 shows the locations of these various research activities. Not all eighty-five locations are unique, nor do they all fall within the contiguous forty-eight states. Upon close inspection of the map one can ascertain a few locations where indicators are stacked one on top of another indicating multiple projects occurring in one physical location. Diamond-shaped objects on the map denote research categorized under the main heading of eye, vision. Star-shaped objects denoted research activities or projects classified under the heading of education, audio-visual aids.

Figure 3
Locations of HEW-funded research
related to visual literacy
1969



Preservation/Protection of Media

The importance of historical data can sometimes be enhanced by analyzing efforts in the present. Two avenues were pursued through which to document the status of visual literacy today. The first was through institutions involved in the preservation of visual history, the second was through current efforts in increasing understanding about visual literacy.

The role of protecting and preserving media over time traditionally falls to libraries and museums. Collections of verbal and visual works are normally acquired and housed in institutions accessible to the public, although there are instances where collections are available only for scholarly research.

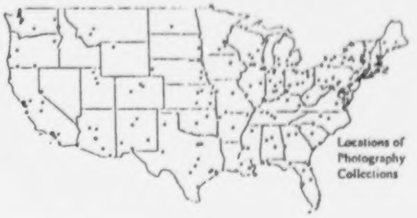
The accessibility and preservation of visual media is a critical aspect of the history of visual literacy since it is frequently only through the act of experiencing a media form that one develops a better understanding and appreciation of the significance of a particular work.

In this regard, photography was selected as the medium to investigate because of two reasons: (1) its tremendous impact on education and learning and (2) Dr. Ray's work which relies heavily on photographic images. As Janis (1989) states, it is through viewing photographic collections that

> "we begin to ponder on all that is known, and how we know it, and what to believe because of it. And we learn how others have come to interpret the world around them through photographic imagery. In the very structure of the camera image, in the very atmosphere of the chemistries, a world lies suspended forever in the photographic cocoon" (p. 16).

An index to American photographic collections (McQuaid, 1982) contains records of 458 public collections of photography. Over 19,000 photographers are represented in these collections. Figure 4 shows the locations of these collections across the United States.

Figure 4
Locations of current
Photography Collections



Current Efforts in Visual Literacy Education in Non-school Settings

The final area investigated was visual literacy in non-school environments.

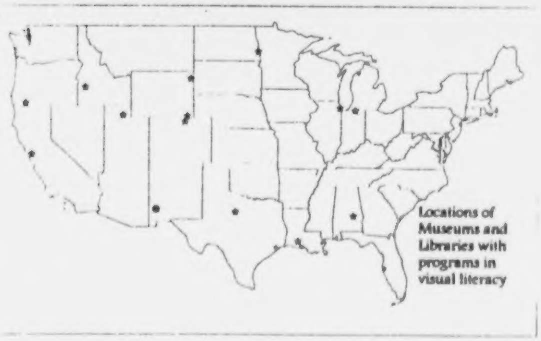
The impact of visual messages on societal communication raises the issue of the role of non-school institutions in increasing awareness and understanding of visual literacy constructs. What efforts are currently in existence that work to broaden the public's knowledge and understanding of visual messages? Are there institutions that supplement the visual literacy educational efforts that typically reside in the school environment? In an attempt to formulate a tentative response to questions like these, a questionnaire was devised to survey libraries and museums on their existing or planned visual literacy programs.

One hundred museums and one hundred libraries were selected from the *Official Museum Directory* (1996) and *American Library Directory* (1995), respectively. Two museums and two libraries were randomly selected from each state. Questionnaires were mailed to the attention of the Director of Educational Programs. The six-item survey asked respondents to indicate whether their institution has developed any educational programs in visual literacy and, if so, the name(s) and description(s) of the program(s), the length of time the program has been in existence, numbers of people participating in the program per session, age of the target audience, and the frequency in which the course is offered.

A total of fifty-five surveys were returned for a response rate of 27.5%. Library surveys returned (34) far exceeded those returned by museums (21), however, museums tended to have developed visual literacy programs at a much higher rate than libraries. Of the twenty-one museum surveys returned, fifteen indicated their respective institution did have programs related to visual literacy. In comparison, only one library indicated a program in visual literacy.

Locations of libraries and museums responding to the survey were mapped using their respective zipcodes. Figure 5 is one representation of the data collected. Each dot on the map indicates the location of a museum or library that has at least one program in visual literacy.

Figure 5
Locations of Museums and Libraries with programs in visual literacy



Although several museums indicated their visual literacy programs consist of gallery talks, specific visual literacy-related programs include:

- Art Safari - a series of children's art adventures with activities that relate to themes such as line, color, form, and shape.
- A visual literacy noontime seminar series.
- Vision and Illusion - a hands-on exhibit that presents visual perception concepts.
- Science ala "CART" - a demonstration that covers light, color and visual perception.
- Museum hunt - a visual awareness self-guided tour.

Unanticipated outcomes from the survey also yielded interesting information, including

- a telephone call from a librarian in Wyoming who had never heard of visual literacy. As a result of the telephone conversation, she received a copy of the brochure describing the 1996 IVLA conference.
- the receipt of several brochures describing specific visual literacy programs.
- indication from at least one museum that the school system in which the museum is located no longer includes art in its curriculum, thereby influencing the museum to establish a drawing program where "the emphasis is on process rather than product" and teenagers and adults work "next to six-year-olds."

Drawing conclusions from such a small sample of data is difficult. However, it is clear from the survey responses that museums have tended to assume a much more significant role in furthering visual literacy awareness than libraries.

Summary and Conclusions

Common threads held this investigative activity together. Dr. Henry Ray, a practitioner in the schools, served as the focal point.

Dr. Ray's strongest connection to seminal works in the field is through his correspondence with Rudolph Arnheim and the consequent visit by Arnheim to the Special Experience Room.

Dr. Ray was instrumental in obtaining Title III money used to construct, equip, and maintain the Special Experience Room. Investigating Title III grant money led directly to gathering additional data on scientific research grants which were likewise funded by the government.

Dr. Ray is an avid and accomplished photographer. His interest in photography prompted us to look into the preservation of photographic images which led, in turn, to the survey of libraries and museums and their influence on developing visual literacy skills through educational programs.

Acting as another common denominator, the mapping strategy necessitated the identification of data sources that could be linked to a physical location. While this strategy was, at times, restrictive, it also opened up areas of investigation that might not have been apparent within traditional historical approaches.

The maps help contextualize the collected data in a visual sense. One can readily see the locations of people directly influenced or touched by one individual educator whose life has been spent working with visual awareness and perception. Schools throughout the country that received Title III money in the 1960's and 1970's to effect, in some way, visual literacy learning and development are observable by physical location within the United States. Scientific research activity on topics related to vision, perception, and learning, in 1969, appear to be clustered in the eastern portion of the United States. Locations of institutions actively involved in the preservation of photographic images appear in every state. The mapping of the location of institutions responding to the survey on visual literacy programs produces a glimpse of the future. The identified locations hold a promise for further enrichment of visual perception and visual awareness for society as a whole.

Viewing these various maps from single data sources yields an interesting perspective on each data source in isolation. However, it is by superimposing one data source on top of another that new questions and new avenues of research may become apparent. Do locations of Dr. Ray's correspondence coincide with locations where Title III money was granted? Are locations of scientific research contiguous with locations of Title III grant money recipients? Are any of the photography collections in close proximity to institutions with visual literacy educational programs? Are there relationships between one set of data and another?

Figures 6 and 7 are examples of superimposing one data source on top of another. New relationships can become apparent and serve as an impetus for further exploration.

Figure 6
Henry Ray Correspondence superimposed on HEW-funded research
1969

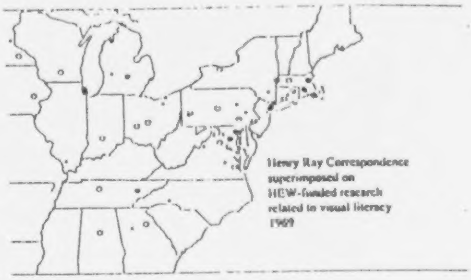
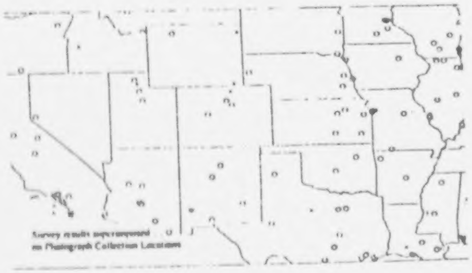


Figure 7
Survey results superimposed on Photograph Collection Locations



Exploring the existence or nonexistence of relationships between diverse sets of data helps integrate or separate data. The geographic mapping of the interconnected data collected in this study provides a visual spectrum that prompts questions and focuses attention on possible next steps in the pursuit of a contextual visual representation of the history of visual literacy.

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Visual Literacy And Just-In-Time-Training: Enabling Learners Through Technology

by Terry Burton

Abstract

It is extensively documented that the best time to provide information is when the learner is prepared and/or in need of receiving it. Until recently, the ability of educators to provide dynamic customized information that is timely and efficient has been limited or non-existent. With the creation of an electronic communication infrastructure and the development of affordable computer technology, course developers and administrators now have at their disposal a unique tool set to accomplish what the author calls Just-In-Time-Training (JITT).

Introduction

"Better to be at the bottom of the right mountain, than halfway up the wrong mountain" unknown

Traditional education systems rely little on student input regarding the quantity, quality or sequence of course content. Lectures, labs and demonstrations are prepared and delivered by faculty in a prescriptive linear fashion. Learners are not allowed to customize the content. Therefore, content may not be based on real needs, but rather on perceived ones. Granted, an instructor is the individual who should be perceiving student needs and translating it into course content. Unfortunately, but necessarily so, instructors create material that targets the general student population. They can not compensate or allow for the extremes of the learner ability continuum.

Disregard of the needs of the learner impedes efficient effective learning. Typically, educational environments are based on the needs of the institution. Faculty, staff, legislative and administrative agendas appear to have a significant effect on the development and deployment of relevant learning environments.

From an instructor's point of view, the one major constant that impedes quality education is time. Instructors need time to spend with individual students, and time to gather extra materials in support of the process, thereby, developing more flexible learning environments.

Allowing for individual learner needs is extremely important. The reality is that there is a limited amount of time to do it in. It would be nice if educators could provide learning experiences that were easily customized to the needs of individuals. This would consist of environments in which students could take responsibility for learning. The author contends that technology can provide the infrastructure needed to enable this type of situation.

Educators can use new tools to be very creative and proactive in designing and delivering instruction. It is time to use them to achieve efficient and effective learning. It is time to take time to create and distribute customized learning environments that can provide visually rich and dynamic learning opportunities.

Technology

When education course content developers have the tools to create an electronic classroom, they will become the facilitators of large dynamic forms of information. Presently the opposite is usually true. The overhead of learning and implementing new technology into a course is often counter productive. It often demands too much time, is complicated and tends to creates large backlogs of pressing work that are nearly impossible complete. This is why it is important for educators to be very cautious in their selection and utilization of available technology.

Being an educator in technical and computer graphics, the author has developed a very simplified approach to qualifying the validity and usefulness of a technology.

Basically, there are three questions to answer.

1. How difficult is the new technology to learn?
2. How much data does the software require to be useful?
3. Does the hardware and software support a *system approach* (Burton, 1995) solution to document creation and management?

The learning curve for some hardware and software seems to be beyond the ability of most educational practitioners. After all, why is the Macintosh computer and its software so successful in education? Simply because it is easy to learn and use. Apple understood early that the way to create useful tools was to make them easy to use. PCs have since adopted this same philosophy with the advent of Microsoft Windows operating systems (OS) and more recently the easy to use GUI of Microsoft NT OS.

Until recently, the basic underlying computer technology for the Internet was the UNIX OS. Those educators with UNIX knowledge were able to use it for developing and delivering Internet based education. The competitive playing field of educational products development was skewed toward these people.

UNIX systems require understanding and management skills that are not typical of most educators. With WIN95 and NT 4.0 from Microsoft (MS), the playing field is beginning to level. UNIX machine manufacturers are trying to maintain their market share against the easy to use` and almost as powerful, NT machines. The technology is migrating to the education profession masses. From this perspective, it appears that NT certainly deserves the time needed to learn and use it.

With the appearance of NT and WIN95 there is a logical migration for most of the data that has been created using Microsoft products. The idea of not having to re-key needed files to run on the World Wide Web (WWW), coupled with the recent Microsoft release of FrontPage, will permit functionally computer literate people to create and maintain a WWW site. This seems to set the stage for a relatively easy migration to NT or WIN95 systems.

Mac users have the same file creation and portability options within their OS with products like Adobe Pagemill and others. However, they do not appear to have a single solution to creating, editing and maintaining a web server that approaches the simplicity and ease of use that MS FrontPage offers. Not only can a PC user create and edit HTML documents, they can test and integrate them into their personal Internet server.

The combination of MS NT or WIN95 and FrontPage, with the ability to import usable existing electronic curriculum content, provides the technology components necessary to create and distribute WWW based instructional materials. Previously, most educational content developers have had to use others to test and maintain their web materials.

Stimulus and response

Unlike most states, Indiana does not have a network of state supported local community colleges. Instead, the two major universities maintain regional campuses. These regional campus programs are intended to be identical with the ones at the main campus. The intent is to provide seamless integration of students participating in a two year regional degree program and give them the opportunity to finish a four year degree on the main campus. From a financial point of view, this system makes a lot of sense. However, from a curriculum administration point of view, it creates tremendous time overhead for instructors.

Each department at the main campus is responsible for developing and delivering specific course content to the regional campuses. Each course coordinator is required to distribute course materials to regional campus counterparts. The intent is to make sure that the content and sequence of the course is consistent with the main campus offering. Obviously, this situation creates overhead for the course coordinators.

Numerous questions and concerns from the regional sites is very time consuming. A straw-poll in the School of Technology (SOT) at Purdue University revealed that most faculty are concerned about the current system and its imposition on them. It is generally agreed that the intended regional campus process has merit. Unfortunately, there is not enough time. With current faculty teaching and research loads, it is almost impossible to provide the kind of guidance necessary to be successful within the existing process.

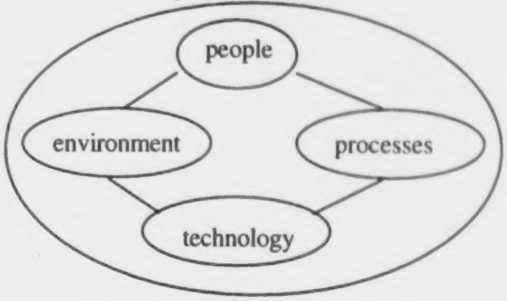
An obvious solution to the dilemma is to use the Internet as a means to provide access to the course information. With the emergence of the World Wide Web (WWW) and its user friendly graphical browsers, it seemed the technical possibility of delivering the kind of information required had arrived. Unfortunately, the limitations of the Hypertext Markup Language (HTML), Computer Graphics Interface (CGI) language and existing hardware were deterrents to a successful solution.

Regardless of the deterrents, when compared to the existing frustrations of administering the regional campus courses, it was time to attempt to use the WWW as a possible solution. The author's TG 105 Technical Sketching course, within the Department of Technical Graphics (TG) Curriculum, offered at numerous regional campuses, was selected as the first course to be placed on the WWW. This implementation consisted of using a system approach to designing, developing and distributing the electronic course materials (Figure 1). In this instance the model is applied to students, instructors and course developer.

The first step is to identify the **people** who are participants within the system. Any successful project should start by defining the intended audience. In this case, the students and instructors of TG 105 are the receivers (customers) of the development effort.

The course developer needs programmers, system administrators and graphics specialists to enable creation and migration of materials to the WWW.

Figure 1
System Model



The **environment** consists of traditional sketching tools and access to WWW enabled computers for the customers. Also, the course developer needs a production environment that will enable the creation of WWW compatible materials.

Processes relative to the sketching course content include psychomotor, affective and cognitive knowledge activities. The customers are responsible for traditional course content. Basically this consists of improving sketching skills and mastering the concepts that are the foundation of technical graphics.

The developer needs to be project manager for the development support team during the production process. Much like a business endeavor, work orders, work logs, deadlines, critical paths and other activities needed to plan and monitor a project are critical to its success.

Technology manifests itself in the form of WWW computers, browser software and printers for instructors and students. The course developer needs supporting electronic data files, HTML translation software, image mapping software, ftp software, WWW server, and other specialty software to be successful.

The product of the initial electronic curriculum effort is located on the WWW at

URL http://tech.purdue.edu/tg/course/tg105. To date it is very successful. The author has not had a single e-mail or phone call concerning the content or delivery of the course.

As successful as the initial WWW effort is there is still significant room for improvement. Two comments are worthy to note. First, it required over two hundred hours to develop and deploy the course. Much of this time was consumed in the production of needed unique or translation of non-compatible data. Second, the technical difficulties were very annoying and time consuming. Dealing with the development of the SOT WWW server infrastructure and finding usable software that was compatible with the author's abilities was difficult.

An initial assessment of the WWW development experience was that it took too long. Compared to previous time expenditures for regional campus course administrative activities, the electronic version took three times longer.

Thankfully, the evolving dynamic nature of technology came to the rescue. More powerful computers, friendly graphic user interfaces (GUI), data exchange speed enhancements and significant automatic easy to use WWW programming tools now make it possible to more easily and quickly create, distribute and maintain curriculum materials. The significant contributor to the new development environment is MS FrontPage.

TG now maintains many of its courses on line at the Uniform Resource Locator (URL), http://tech.purdue.edu/tg/courses/.

FrontPage

It is not the purpose of this paper to promote a single vendor or software. However, the preliminary indications are that the significance of FrontPage to educational materials developers, with average technical ability, warrants some discussion.

Most experienced educators are adverse to the impositions placed on them by emerging technology. Their stress, identified as *techno-stress* (Burton 1990), can usually be attributed to a failure to recognize the impact a new technology will have. Microsoft, in its continuing battle to define and promote the frontier of the Internet, created and freely distributed a new product called FrontPage. From this author's perspective, their effort to create a non-techno-stress Internet development tool is proving very successful and timely.

FrontPage is, according to M. Mathews (1996) in his book *Web Publishing with Microsoft FrontPage*, "...a very easy-to-use, full featured set of tools for the expert creation, delivery, and maintenance of web sites. And FrontPage does this in a WYSIWYG environment..." In short, technically challenged individuals now have a tool to create and maintain a rather elaborate web presence. Frames, discussion groups, easily created links, the removal of hard HTML coding and an easy to use GUI are just a few of its many attributes.

FrontPage can be downloaded from the MS home page at http://microsoft.com/sitebuilder. The software automatically downloads and configures on your machine at the appropriate prompts. There is a tutorial application within the software that is easy to use. The ultimate significance of FrontPage to the educational community is hard to predict. Realizing the potential that this software possesses will be a creative enjoyable endeavor. If control of the development and distribution environment is the issue, then FrontPage solves it.

Industry

To attain the vision of a truly dynamic virtual classroom, the author visualizes another attribute that is needed in WWW developmental efforts. That is the creation of intelligent student oriented documents. It is perceived that a database populated with discrete information that is capable of creating dynamic documents, at the request of students, is needed.

During the past four years, the author has designed and implemented numerous technology rich systems that are being used to provide virtual visual information to customers. They consist of unique software products and visual libraries that provide the user on demand dynamic documentation. All of these systems focus on the lowest common denominator of PC technology.

Much like the previous discussion of the typical educator's limited technical envelope, these systems are designed for process functionally literate people that do not have the time or experience to use most industry communication technology products. They are not required to learn cryptic commands to get information. Workers can customize documents based on needs. Using the metaphor of the industrial Just-In-Time (JIT) processes, which provide only the materials and equipment necessary to perform a specific task, the dynamic on demand documentation system created by the author is called Just-In-Time Training (JITT).

The Next Step

Admittedly, HTML pages allow for hypertext links that provide avenues to more specific information. This information could be classified as a dynamic activity. The reality is that the links simply load onto the computer another static HTML document. Static, in this instance, refers to the pre-configured nature of most HTML and not the animation components of some pages. Although the later is dynamic in that it is animated, it is not dynamic in regard to its ability to change with different people accessing it.

Also, experience shows that most hypertext links tend to provide too many options and deter the focus of the inquiry. That is, when an inquiry is made to find information, it is not uncommon for the inquirer to wander off to some distant insignificant information. This is what is typically referred to as *web surfing*. Surfing the web is supposed to be a structured activity with a focus and goal. The reality, based on observations, tends to indicate that the original focus of a request becomes minimized when web surfing.

It seems that the WWW experience needs one more vital component. A component that attempts to prevent aimless wandering and provides a dynamic page assembly that includes information in a usable form. Not a series of URLs, but an assembly of information that appears to have some form of intelligence. It is proposed that this customization occur in the form of database activities similar to the previous industrial examples.

The dynamics of this new learner environment lie not only in the ability of the database engine to retrieve documents relative to the request, but to also provide only the amount of information needed to perform the task., i.e. JITT. This suggests that a record of student performance and abilities has a bearing on the quantity and type of information that the student receives. By logging on to a URL, the learner would bring all of their attributes with them. Previous class performance, academic history, reading ability levels, IQ, interests or any relative data deemed significant by the instructor to better customize the information. That is not to say that the learner could not access other information. Just that the results of the request would better fit the learner's abilities and needs.

Concurrent with a customized amount of data there would be a tendency to provide as much graphic visual information as possible. Since graphic information provides faster interpretation and comprehension, an attempt would be made to alleviate language and ability levels within the dynamic composite documents. This movement from text based documents is relative to the author's previous industrial observations and preliminary data that indicates a sixty-two percent task comprehension time savings for workers using dynamic documents over traditional documents (Burton, 1995).

System Attributes

A proposed dynamic JITT system would consist of an **Internet** (public area), **Intranet** (private area) and a **Development** area (Figure 2).

The **Internet** component is comprised of user information services. With a typical WWW look and feel, this accessible area is the final display area of dynamic data for the learner.

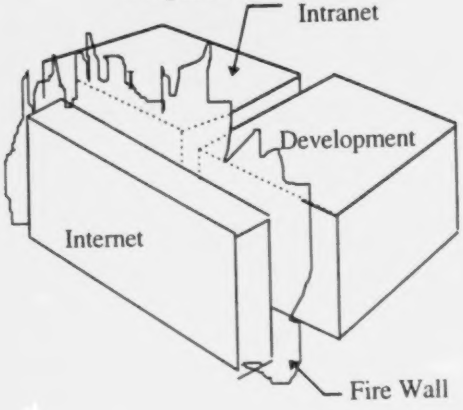
This site keeps track of user input and movement. It collects data from the user for the Intranet database. This data helps create the customized intelligence of the Internet display.

In the dynamic Internet, students can enter discussion areas, review syllabi, see student work examples, submit their work for posting, look at grades, read or print course material while viewing customized information for their developmental needs.

Residing behind a firewall and not accessible from the Internet , the **Intranet** is where sensitive documents, programs and program links reside. It is the repository of a large amount of data required for the success of the dynamic Internet experience. This area includes grade lists, class rosters, and other cumulative data that provides a profile of the user.

The **Development** area is where the project testing and other not ready for release components reside. Much like software alpha and beta versions, data in this area is highly proprietary and accessible only to the project managers and developers. This is a place to experiment and test ideas. Because of its rather volatile nature, the development area is isolated from the other areas.

Figure 2
Proposed Dynamic Web



Summary

The original intent of this paper was to present a current system that the author was using to create and distribute WWW course materials. But true to its continuing expansive nature, technology imposed heavily on the original concept. The issues and solutions that have transpired since the abstract for this paper was written have been significant. In short, the need and desire to further develop the original process proved to be unwarranted.

The original course materials are metamorphosing into a more significant and relative JITT product. As mentioned earlier, the current project can be observed in the author's personal URL at Purdue, http://knoy329.tg.purdue.edu/tg105. Use the "Cuss-n-Discus" hypertext link on the TG 105 home page to submit comments about the site. This is a closely monitored area so inquiries will receive an immediate response.

The obvious migration of the graphic emphasis in this proposed strategy is to use the Virtual Reality Markup Language (VRML). VRML is another powerful emerging tool that should further enhance the learner's experience. Purdue University TG Professor Dennis Short has a VRML sample running at http://knoy.337.tg.purdue.edu.

Dynamic JITT learning environments, delivered over the WWW, will have a significant impact on future education. They will provide learners with customized virtual learning that facilitates efficient utilization of time resources. The cumulative effect will be the expansion of student visual literacy. The dynamic JITT abilities will help reduce the inadequacies of traditional educational content delivery.

Now is an exciting time for educators and content developers. The opportunities are real. Motivated visionary developers are moving into an area that may prove to be the next frontier for education.

Technology has, and is, fulfilling its obligation to make the development and distribution of relevant course materials less difficult. All that is required of today's educators is a commitment of resources for participation.

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Attaining Visual Literacy Using Simplified Graphics in Industry

by Terry Burton

Abstract

Under the current ISO 9000 certification, just-in-time engineering (JIT), demand flow technology (DFT), and total quality management (TQM) demands, industry is attempting to implement available technology to solve their documentation creation, control and delivery needs. In most cases, their efforts are in need of outside resources to analyze, develop, propose and implement usable solutions. This paper reveals a single solution, by outside contracted resources, to quantify, justify (ROI), create and deliver 3-D modeling based graphics into a systematic communication environment. Software and hardware delivery systems are presented in support of communication instruments required for manufacturing and assembly processes. Electronic examples are presented, with supporting data, as evidence of the value that a simplified graphics system approach has on visual literacy in industry.

Introduction

American industry is embracing computer generated 3-D geometric modeling as a means to facilitate quality improvements in engineering design and manufacturing. Previous to the current movement to modeling, industry employed groups of skilled graphic production people to develop, distribute, revise and store graphic information. These groups would spend countless hours creating and recreating graphics for a variety of documentation. Engineering drawings, assembly graphics, catalogs, production documents, service manuals, advertising, training information and many other types of graphics were produced to meet their needs. It is significant to note that a graphic is being defined as an iconic or digital (digital in this instance means alpha and/or numeric information) image or document that is used to accomplish communication (Burton, 1989). This paper is an attempt to quantify some of the variables affecting graphics in industry and to qualify a strategy for implementing a visual based graphic system, delivered just-in-time (JIT), in an intense industrial training environment.

Industry observations

Over the past two years, an analysis of industry graphic production and distribution processes of over seventy-five moderate to large American corporations located in nine states and Mexico, has revealed tremendous under utilization and duplication of creation tasks of graphic products within companies. It was discovered that images developed for use in one department were being recreated in other departments, frequently at exactly the same time. Most departments were operating independent of knowledge and resources of other areas. This revelation indicates clearly a need for better communication and coordination of graphic production. Possibly there could be a graphic database of information that could be distributed corporate wide.

Along with the discovery of inefficient graphic operations, it was also observed that the revision and updating process for documentation was not timely or accurate. Numerous engineering and management document changes were not being posted in a usable timely fashion to the departments. JIT was not a reality. This lack of dynamic updating creates potential for errors and waste within a corporation.

The corporate documentation processes, when analyzed holistically, indicates a need to develop a system of distributed information that is dynamic (addressing the needs of concurrent engineering), quantifiable (relates to the issues of ISO 9000) and usable (providing an atmosphere for JIT and Total Quality Management TQM environments) within the current corporate structure.

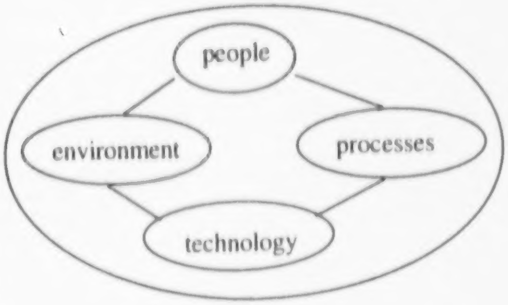
Electronic corporate information delivery systems have been in use for several years. Most often they are referred to as MRP (Manufacturing Resource Planning), PDM (Product Data Management) and EDM (Electronic Data Management) systems. MRP was also the acronym for Material Resource Planning. It has recently evolved into Enterprise Resource Planning (ERP). To confuse the "acronym soup" of our language even further, EDM has also been referred to as Enterprise Data Management and Engineering Document Management systems.

MRP systems are typically corporate level wide information networks that integrate manufacturing, financing, maintenance, distribution and data transfer functions. These systems are very limited in their ability to archive and distribute graphic information. This technology was developed in the late 1970s and tends to carry the "technical baggage" of such systems.

However, PDM and EDM systems are an emerging technology. These acronyms reflect a subtle difference in functionality between systems, but often they are used interchangeably. They are attempting to provide updated information, restrict access to sensitive information, and control revisions to a variety of production and manufacturing documentation. Unfortunately, the vision of these products and their reality are still far apart. As with most new technologies, the promise of PDM and EDM have grown faster than both available products and the available experience to understand and utilize it effectively.

The success of a corporate level implementation is often restricted or prevented by the weight of bureaucracy, technology or personnel ability limitations. It is the opinion of the author that corporations tend to lose their effectiveness in implementing change when they abandon involvement of user level personnel. Admittedly, the ultimate success of the development and implementation of a new technology and/or system must be consistent with the existing corporate systems. However, it is more important that the end users have input into and realize direct benefits from the creation and implementation of such systems. In short, people (Figure 1) are the most important component of any system and deserve the largest commitment of resources.

System Model
Figure 1



Corporate graphic production

The arrival of computer-aided drafting (CAD) has added another component necessary for changes in how industry can create and distribute its graphics. Though CAD solved some of the problems of storage and revision, departments continued to create graphics for their own needs independently. Industry merely changed the tool for creating graphics and did not immediately see a need to change the process.

With the emergence of CAD, industry began to recognize the need to incorporate a PDM or EDM system for distribution of their graphic products. Communication infrastructures have emerged as a necessary entity in the development of efficiency strategies in the creation, revision and distribution of graphic data. However, in this instance, the focus of effort was on the interpretation of engineering design to engineering documentation. Typically, little or no effort was expended at the corporate level to find and apply potentially significant uses of these engineering graphic products in other

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departments. Sometimes, individuals in aftermarket parts, service or marketing would see the benefit of having such information available. But, due to limitations of the available technology, pressure of current work loads (relative to the issue of corporate control on head count, etc.) and corporate structure exploration and development of the necessary linkage to acquire the information was frequently prevented. Like most technology, CAD solved some problems, created some problems and provided opportunities.

The next generation of graphic technology has seen corporations embrace the geometric 3-D modeling processes. Several technology companies have created and marketed powerful modeling tools. These tools have allowed industry to push technology farther into their engineering design processes. Now the engineer can use a computer to electronically design and create new products, jigs and fixtures in a modeling prototype environment. This helps to reduce the product design to production time previously required. A large database of modeling information that has the potential to provide graphic products for many uses is being developed.

It seems logical to assume that if an engineer creates a 3-D model of a new part that is archived, besides the obvious benefits to the production and computer integrated manufacturing environments, another potentially tremendous opportunity exists. Other departments and entities within the corporation could benefit from having access to a 3-D model database. For example, the aftermarket parts department personnel could use a snap-shot of the model, oriented in a pre-determined position, as a line illustration in one of the electronic or static parts catalogs.

The opportunities for the utilization of such 3-D information are almost limitless. However, there are two issues that arise from this opportunity. First, there is the issue of modeling standards. With current technology, for interested parties to be able to utilize 3-D models, the model must be created to a pre-determined standard. The process of sequence of model creation, coordinate locations and other modeling practices must be defined so the model is usable in other departments. A model created with standard parent-child relationships, built from the inside-out, would be of little use to a marketing department that only needs external detail for their graphic product. Typically, there would be no need for the internal components of a product that were not visible from the outside. Therefore, it would predictably destroy the internals of such a product. Obviously and unfortunately, if the model was constructed from the inside-out, linking one part to another with the parent being the inner most part, the model would be destroyed. To prevent this from occurring, a set of standards for creating and developing 3-D models must be created.

Secondly, although it is ideal to believe that an engineering 3-D geometric model is usable to the majority of graphic users, the technical reality is different. Although PDM and EDM vendors claim that the distribution of models is simple, it is not. The unacceptable nature of the access of modeling data can generally be attributed to an ability shortcoming of the hardware and software. This technical problem manifests itself by causing large amounts of computer time to retrieve and manipulate graphic information. It is not uncommon for the movement of a model from a corporate graphic vault to a requesting terminal to take twenty minutes. In most instances, this is a totally unacceptable amount of time. Graphic data is difficult enough to retrieve and manipulate in a non-modeling 2-D environment, much less adding the amount of data memory necessary to access an engineering model. Storage needed for models and the overhead of graphically inadequate corporate data delivery systems make it difficult to use 3-D geometric models. There is a need to reduce the amount of data that a typical engineering model requires. It is suggested that a simplified version of the model be created for access by those corporate entities that require it. This would also require the development of a standard for simplified models.

Simplified models

The full potential of engineering 3-D geometric models within a corporation can be realized by utilizing a simplified modeling approach to development. The development of simplified models logically unites the simplified graphics strategy, similar to the one proposed by the aerospace industry, and 3-D geometric models.

The simplified graphics strategy permits the creation of a completely electronic documentation environment without the data magnitude associated with typical graphics files. A set of standards for reducing the amount of data contained within graphic files was developed. In short, stripping unneeded graphic information from document files enables the significant reduction of the amount of electronic storage space required. It is interesting to note that by performing a rigorous graphic analysis of the minimum needed graphic information or cue, it was discovered that the ability of graphic information to communicate predetermined specific information was effectively enhanced.

Extending this simplified graphic logic to the 3-D geometric model provides a means to create simplified models that are usable in a variety of industrial applications. Simplified modeling database development, with current available technology, is a logical solution to providing corporations with usable graphics for a variety of needs. Each department has access to the simplified model database. Unlike the legal and ethical issues that arise from the distribution of 3-D geometric models outside the corporation, a simplified model could be used for this purpose.

The potential benefits of developing and maintaining a simplified model database are extensive. Product design engineers could begin creating the geometric model, according to a predetermined sequence, and at some point the model could be defined as being simplified. When it reaches this stage of development, it could then be saved as a new file. Just like the subsequent high level engineering geometric model, the simplified model can be accessed, rotated in space, exploded, rendered, and messaged to a usable form using a fraction of the computing power and storage required for the high level model. This customized graphic entity, extracted from the simplified model, could then be saved in a graphic vault, be owned by the developing department and made available to the rest of the corporation. The resulting small graphic files and subsequent graphic database can be more easily distributed over current corporate electronic systems than the high level 3-D geometric model.

Graphic engineering

Graphic engineering, the process of designing, creating, evaluating, archiving and distributing graphic information utilizing a systems approach, could be thought of as the emergence of a discipline that is the direct result of current and developing graphic technologies.

Graphic engineering allows the creation and distribution of electronic graphic information that contains all of the data necessary to produce a product. As corporations develop in their understanding and implementation of graphic based solution strategies, there will be an emergence of a new discipline that will utilize *graphic engineers and graphic engineer technologists*.

A graphic engineer would be responsible for the standards and practices relative to the development, storage and distribution of graphic products. Having a strong background in the visual sciences (Bertoline, 1993), this profession would emerge with personnel who could create good graphics, consult and set standards for graphic production. Finally, they would be managers with the ability to design, develop and distribute graphic systems cooperatively within an organization. ISO 9000, TQM and JIT movements that require analysis and review of corporate document systems would tend to support the emergence of such a profession.

Realistically, the selling of graphic engineering as a discipline is a non-commodity based issue at this time. Individuals possessing all of the required attributes to be graphic engineers are not yet aware of their potential to be a part of the emerging graphic engineering.

It is possible that a person could someday attend a university and major within its School of Engineering in Graphic Engineering, or within its School of Technology in Graphic Engineering Technology. It is apparent to the author that within industry there is a need to provide this type of opportunity. Further more, it seems logical that this profession would become the developer and guardian of the utilization of graphical information as a means to provide non-language dependent communication environments capable of spanning across cultures. Thus, we may be able to provide a technical visual solution to the language barriers that many cultures must cope with when entering a global industrial setting.

The power of graphics

Hypothetically, the appeal of a highly effective real image based visual communication system utilizing 3-D geometric modeling and simplified modeling databases, along with an efficient delivery system, would have a significant impact on current manufacturing processes.

Considering an analysis of current industrial work forces, and the realization of the global marketplace, it seems the application of a graphic based system would be beneficial when applied to a company or manufacturing environment with a:

- large training overhead due to multi-lingual environments
- large variation of jobs.
- low formal education
- poor attitude
- and have a high rate of turnover.

The type of graphic system proposed for implementation into a typical industry production environment would consist of a/an:

- electronic database distribution system.
- 3-D simplified modeling strategy.
- graphic database development and maintenance environment.
- custom graphic distribution software that is non-intrusive on existing systems or databases.
- dynamic real-time revision and updating of graphic information.

The success of such a simplified modeling based graphic system exists in its ability to effect change and improvement within the workforce by:

- meeting specific needs of its users.
- preventing excessive duplication of graphic tasks.
- positively effecting communication.
- providing predictable consistent responses to graphic stimulus.
- effecting total quality.
- providing a positive return on investment (ROI).

The following preliminary Pilot Case Study is presented as evidence of an attempt to substantiate the previous discourse and proposed graphic based simplified model system by implementing it into a real industrial setting.

Preliminary pilot study

Preliminary evaluation

The Whirlpool Corporation (Corporation) facility in the Purdue Research Park in West Lafayette, Indiana was experiencing what it defined as "excessive training investments" required to maintain the current production quality and quantity. This facility's main function is the packaging of aftermarket parts.

At the request of the plant manager, a systems analysis of the current work environment was performed. The purpose of the analysis was to determine if the potential existed to apply the previously presented system solution and graphic products in an attempt to alleviate some of their training overhead.

Many of the employee characteristics deemed necessary for a graphic based solution strategy were in evidence within the packaging facility. They included but were not limited to low motivation, high rate of turnover, large number of parts and a variety of complex procedures.

Demographics

The management staff at this plant consists of ten full time employees. Their average age is thirty-two years. They average approximately fifteen years of formal education.

The production workers consist of four-hundred fifty part-time student employees between eighteen and twenty-five years old at varying levels of completion toward their undergraduate degrees. The average worker turnover is approximately eighty percent per year and has been as high as one-hundred thirty percent. This employee turnover is a significant contributor to quality, assembly, part verification and excessive training overhead problems. Production employees are required to work a minimum of twenty hours and no more than thirty-eight hours per week.

Production

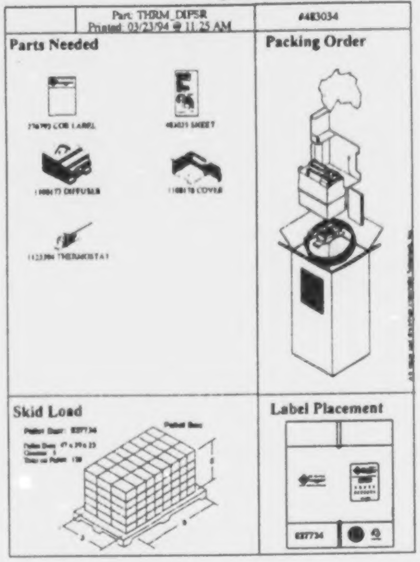
Currently, the Corporation processes over seventeen million parts per year. There are over two thousand five hundred stock keeping units (SKU) and kits derived from a total of six thousand eight hundred different components. The two thousand five hundred SKUs, are cycled to produce over fifteen thousand different jobs requiring training and retraining each year. These jobs are divided into three different production areas Combi (automated packaging machine), Manual Pack and Polybag.

Proposed system

After analyzing current documents and processes, it was determined that the development and implementation of a graphic based system to make and deliver visual operation sheets would be beneficial and cost justifiable. The new system must:

- provide the ability to be updated quickly and easily as there are a large number of changes that occur on each packaging job.
- not intrude on the existing systems or database information currently in use because job scheduling and process information exists in a management level MRP system inaccessible to the Corporation.
- be serviceable and deliverable within house.
- be capable of providing part verification, pallet configuration, label placement and assembly procedures.
- reduce mispacks and reworks while increasing employee productivity.
- be deliverable on the current PC technology computers.

Visual Op Sheet
Figure 2



To satisfy the needs of the new system, it was proposed to the Corporation that a simplified model graphic database of all components be created, a new visual operation sheet (Figure 2) be designed and implemented to augment and eventually replace the existing paper bill-of-materials type operation sheet

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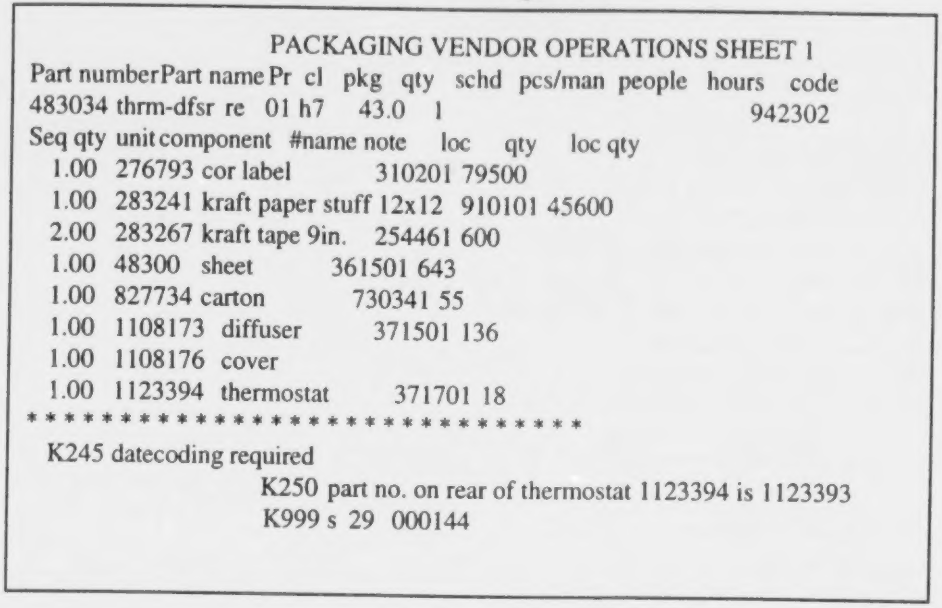
(Figure 3), and a new software capable of existing within the current technical envelope of the Corporation to generate the new operation sheets (op-sheet) be developed and implemented.

Old Op-Sheet
Figure 3



```
                    PACKAGING VENDOR OPERATIONS SHEET 1
Part numberPart name Pr  cl  pkg  qty  schd  pcs/man  people  hours  code
483034 thrm-dfsr re  01 h7   43.0  1                                 942302
Seq qty unit component  #name note    loc    qty    loc qty
  1.00  276793 cor label          310201 79500
  1.00  283241 kraft paper stuff 12x12  910101 45600
  2.00  283267 kraft tape 9in.   254461 600
  1.00  48300   sheet         361501 643
  1.00  827734 carton           730341 55
  1.00  1108173  diffuser        371501 136
  1.00  1108176  cover
  1.00  1123394  thermostat        371701 18
*******************************
  K245 datecoding required
                    K250 part no. on rear of thermostat 1123394 is 1123393
                    K999 s 29  000144
```

The project would serve both internal and external customers. Internally, production schedulers, small parts personnel, selectors and production workers would benefit directly. The packaging process would become clearer and employees would have a better understanding as to what is expected of them, significantly reducing the potential for reworks and other errors. Consequently, other agencies within the Whirlpool organization would have access to the graphic database as needed. Externally, the consumer would be less likely to receive wrong or incorrectly packaged parts.

Along with the immediate benefits of the proposed system, one of the significant features is that it would allow expansion for future graphic products to be developed. The 3-D graphic database permits the development of animations and other graphic products to support the training required to perform an assembly process. Also, the new software permits the electronic distribution of visual operations sheet data (op-sheet) to the assembly workers. The infrastructure exists to accomplish these and other future tasks.

Project justification

To justify the funding of this project a simple return on investment (ROI) was used. It was discovered that fifteen percent of all jobs (2250) were being performed in the Combi area and the rest in the Manual Pack and Polybag areas of the plant. It was determined that the difference between the set-up and training required for Manual Pack and Polybag production areas was consistent but differed by the number of people at each job station.

A First Part Inspection (FPI) used for checking initial quality of each job at its start, as the end of the training component in the job setup, determined that it took each employee approximately fifteen minutes per job to reach the FPI.

The total training time expenditure for Combi jobs is 15% of 15,000 for a total of 2250 jobs. Combi has approximately 5 employees per job. Therefore, the total Combi jobs equivalent is 11,250 jobs. If it takes 15 minutes to reach FPI, then 15 x 11,250 equals 168,750 minutes or 2812.5 hours of training time per year. At a base wage rate of $8.00 per hour, including benefits, this works out to $22,500 spent each year for job training.The total training time for Manual Pack and Polybag areas is calculated by taking 85% of 15,000 for a total of 12,750 jobs times 15 minutes to reach FPI for a total of 191,250 minutes or 3187.5 hours expended on training per year. Using $8.00 per hour, this totals $25,500 per year for job training.

As a goal, an initial savings of 10 minutes per job in training was predicted. This would result in a combined total direct labor savings for a year of 66% or $31,680.

Residual or indirect benefits could be calculated by applying the above time savings to a projected increase in production. The 6000 hours saved in reduced training time could result in 409,960 additional parts per year. The dollar amount of savings is not known. However, the production employee time saved would in effect add the equivalent of 2 weeks of full production to the plants capabilities. This information and some preliminary testing persuaded management to initiate the proposed project.

Project team

Selection of team members for this project was based on management and leadership skills, planning and project coordination, total quality management knowledge, extensive production and packaging knowledge, packaging engineering services, technical services and project design and implementation. The Corporation team was composed of 8 people, which included the plant manager, production supervisor, quality control personnel, packaging engineers and technical manager. The external team consisted of a graphic engineer, a computer programmer, a computer technician, a project manager and 10 computer graphics modelers.

Implementation

The completion of models and software products took 6 months. Implementation and system testing took 2 months. Another 2 months was needed to bring the system to 90 percent efficiency. It is currently running at about 98 percent complete. The other 2 percent is due to the dynamic nature of the parts updating and op-sheet changes that occur daily. The current level of operation is considered by the Corporation to be optimal in nature.

Preliminary data

Data collected from production documents and observations is presented as preliminary evidence to indicate the potential for conducting a formal study to verify the perceived significance of the simplified modeling and graphics (Simgraph) project. The success of the project was measured through quantitative, qualitative and intangible benefits. The introduction of Simgraph to the production process reduced the time it takes to perform initial job setup by an average eleven minutes per job. Time savings were realized by reducing job setup time that includes reading the op-sheet, performing part verification, completing FPI and assembling the sample first part.

Setup time was reduced from nine minutes to four minutes for a 56% reduction. However, the most significant procedural time reduction came about in the skid pattern identification and label placement verification process. The time necessary to perform these operations went from five minutes to mere seconds.

Another benefit of the Simgraph system was a greater than expected reduction in training process time for new employees. A 20% reduction was projected, however, an average time saving of 62% per trainee was achieved. This includes a reduction of op-sheet learning time, pre-assembly parts verification and quality certification FPI time.

Rework reduction produced by Simgraph has not yet been reflected in the Corporation quality parts per million. This data will be revealed when the system has been in operation for a one year period. However, not a single rework has been attributed to the Simgraph system. Also, component verification errors and part assembly errors during the initial stage of implementation have been visibly reduced.

The total yearly projected savings, at this time, directly attributed to the Simgraph project, is $42,500. This number does not include the significant residual savings as stated earlier in the Project Justification.

Internal customer satisfaction has become evident through the actual time procedures reduction affected by Simgraph. The quality certification process that measures new employees' comprehension of the op-sheet and shipping procedures has shown a reduction of testing time. This is an obvious increase in the efficiency of comprehension within the training process. The training staff reported that, "Simgraph is an excellent work-simplification tool."

Conclusions

Technology provides the opportunity to develop electronic tools for industry that are capable of solving a number of visual communication and comprehension problems. Previously, most of these problems were impossible to solve. This paper introduces a huge opportunity for those who wish to pursue the realm of synthesizing graphics, engineering and technology to create visual environments that promote visual literacy.

Although some would say that the environment created at Whirlpool could have been solved with multi-media, other off-the-shelf authoring packages or a visual database product like Microsoft's Access or Borland's Paradox, let it suffice that during the testing and evaluation of the proposed graphic system solution, those products were tested and proved to be severely lacking when confronted with the magnitude of this project. Custom software for specific solutions is infinitely more adaptable in needs based environments.

It is the belief of the author that the solutions to many industry visual literacy training problems can be solved by designing and implementing discrete systems that perform specific visual information tasks. These systems must be compatible with, and a part of, the corporate data and technical envelope. They must also be non-intrusive on current systems. Top-down approval and bottom-up utilization scripts these type of systems for success.

The emergence of a graphic engineering discipline is inevitable. It may not be called graphic engineering, but a discipline that has as its roots in the fundamentals of communication, graphic creation, archiving, distribution and visual literacy while in a technical environment, will emerge. Unlike technical systems people, programmers, drafters and designers, although drawing from parts of all of them, when opened for closer scrutiny these individuals will know graphics, communication and technology. They will be able to apply graphics and its products to create environments that are visually far more powerful than those currently being used.

Other industries have used systems similar to the Simgraph system. One Fortune 500 company had a math and reading assessment survey performed on their union employee population that revealed that math and reading levels, according to a standardized test, were at fourth and fifth grade levels. Further testing revealed the workers had very high math and reading ability levels.

When they were offered the possibility of providing visual graphic tools and a system to distribute them within their company, they immediately realized that the creation of an environment that was not formal knowledge dependent would allow them to enable the workers to succeed in spite of their deficiencies. A system that provided comprehension, through visual literacy, using graphic images of products and procedures worked. Although success stories are too numerous to list, this example is typical.

The time appears to be approaching when graphic engineers will and must be able to design and distribute systems that are not language dependent. The need for such systems has existed before the development of formal language. Communication was based on grunts, gestures and of course, pictures. Is the reality of turning to a basic instinctive need to communicate with "pictures" the solution that frees us from the communication barriers that currently exist?

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A Philosophical Discussion of Representation

by Sandra E. Moriarty and Keith Kenney

Abstract

The purpose of this piece is to analyze the nature of representation, review the most critical issues—pictures and reality, resemblance or convention, and develop a model of representation that will satisfy as many of the philosophical concerns as possible. The model maps representation in terms of four types of processing—natural perception, abduction, convention, and cognitive processing.

Introduction

One of the most basic theoretical areas in the study of visual communication and visual literacy is the nature of representation. Much of the discussion of this topic comes from either philosophy or aesthetics. This paper reviews some of the more important writings in this area in an attempt to develop a model of representation. The primary works reviewed include:

- E. H. Gombrich, "The Visual Image;" "Representation and Misrepresentation"
- Nelson Goodman, *Languages of Art: An Approach to a Theory of Symbols,* "Representation Re-presented"
- Paul Messaris, *Visual Literacy: Image, Mind & Reality*
- David Novitz, "Picturing"
- Marx Wartofsky, "Pictures, Representation, and Understanding;" "Visual Scenarios: The role of Representation in Visual Perception"
- Richard Wollheim, "Representation: The Philosophical Contribution to Psychology;" Pictures and Lan-guage;" and "Art, Interpretation, and Perception"

In describing the requirements for a general theory of representation, Wollheim (1993) says it must answer two questions:

- What is it to represent? (what is the relationship between the representation and the something that it is of?)
- What, in the narrow sense of the term, is a representation?

Using his two questions to guide our analysis, we find that the major theoretical issues that need to be investigated include: Is pictorial representation based on natural resemblance or convention? What is the relationship between pictures and reality? Finally, as part of this review, we are investigating whether it is possible to develop an overriding theory of representation that accommodates the various issues and viewpoints.

Pictures and Reality

In beginning this discussion, let's first look at Wollheim's second question about what is a representation. This question investigates the nature of the image and how it does or doesn't mirror reality. The debate here seems to focus on the role of likeness, resemblance, and denotation in depiction.

The conventional approach is to define depiction as reference by a visual to something it resembles. This traditional view is expressed by Gombrich (1972, p. 88) who claims that iconicity is genuine representation. "It may be convenient here to range the information value of such images according to the amount of information about the prototype that they can encode. Where the information is virtually complete we speak of a facsimile or replica. ...Even facsimile duplication would not be classed as an image if it shared with its prototype all characteristics including the material of which it is made. A flower sample used in a botany class is not an image, but an artificial flower used for demonstration purpose must be described as an image."

In other words, a visual is "of something" and, according to Wollheim, that "ofness" de-mands that every representation have an objective. Wollheim (1993b, p. 161) identifies three misinterpretations of the ofness thesis:

1. The Figurative thesis: for every representation, its object can be described in figurative terms.
2. The Existential thesis: for every representation, there must exist an instance of the kind that the something represented can belong to—i.e. there can't be representations of unicorns.
3. The Portrayal thesis: for every representation, there is a particular

> something that is represented: every representation is a portrait.

In other words, the "ofness thesis" does not deny that the object can be imagined, such as a unicorn or fictional characters.

A number of scholars including Nelson Goodman (1988, p. 122) consider resemblance to be a dogma from which we must free ourselves. He observes, "To suppose that the distinction between pictorial or 'iconic' and other symbols rests on resemblance is nevertheless a prevalent and pernicious mistake." His point is that resemblance cannot account for the difference between symbols that depict and those that do not. Goodman sees all depictions as symbolic, and therefore they must be analyzed within the context of culture and learning. The relationship is not based on "ofness" but on "standing for" and the stands for relationship, which is basically a symbolic one, does not need resemblance. Goodman also reflects Gombrich's (1972, p. 82) viewpoint who sees the visual as symbol: "What a picture means to the viewer is strongly dependent on past experience and knowledge. In this respect, the visual image is not a mere representation of "reality" but a symbolic system."

Goodman (1988, p. 122) argues that likeness is neither required nor enough for pictorial depiction. Likeness is not a matter of how many properties two things have in common. Likeness varies with the comparative importance among the common properties and thus with interest, context, and custom. A picture may count as realistic to the extent that it depicts in the accustomed way. Although he admits that resemblance is intricately related to realism, in his view, realism is an artifact of current pictorial practice:. "Both the realism and the likeness may increase or diminish or vanish entirely with a change in custom."

Goodman (1988, p. 126) admits that pictorial representations are both iconic and symbolic. As a matter of fact, he asserts that pictures must always be analog symbols and that the pictorial and the analog are clearly related. He argues that the basic notion of reference, or symbolization, the relation between a symbol and whatever it stands for in any way, governs pictorial representation (p. 124). The pictorial relationship, in other words, is based on denotative notions of a visual "standing for" something else and that is the meaning of representation.

In contrast, David Novitz (1975, p. 155) argues that Goodman and others who deny the importance of resemblance misunderstand the difference between how a picture is produced and how it is used: "Insistence on the claim that picturing is fundamentally denotative because pictures stand for what they picture is the result of a failure to discern the crucial distinction between pictures and their production on the one hand, and the use made of pictures on the other." In other words, he feels pictures do not stand for things without being used to do so; it is an intentional relationship. He believes that picturing does not work by denotation; to say what a picture is of is just to say what kind of picture it is, but is not to say what it denotes. The word "representation" can be used both to mean *a picture* and *to picture*, i.e. the use made of the picture as an illustration, a warning, a map, etc.

Because of his reluctance to assign denotation to visuals, Novitz (1975, p. 150) admits to taking the unfashionable position that "visual resemblance is a necessary condition for picturing, and that recognition of such resemblance is a necessary condition for determining what a picture is of."

We feel that the answer is not one of resemblance or symbolism but that there are different types of images and they are represented, as well as interpreted, in different ways. One way to categorize the nature of the visual is in terms of C.S. Peirce's (1991, p. 181-183, 251-252) three categories of signs: iconic, indexical, and symbolic. This schema is broad enough to include both Goodman and Novitz. Peircean semiotics defines an icon as similar to is subject; in other words, iconic signs carry some quality of the thing they stand for, as a portrait stands for a person. Most often an iconic sign is a representation such as a drawing or photograph where likeness or resemblance is a determining characteristic. Iconic visuals are highly denotative. An indexical visual is physically connected with its object, an indication or sign or cue that something exists or has occurred—a footprint means someone just walked by or smoke means there is a fire. Iconic visuals are also denotative but they operate as a puzzle with the viewer involved in an observational guessing game to make sense of the connection and identify the object. Symbolic visuals, however, arbitrarily stand for something through a process of consensus as a word stands for a concept. A symbol, such as a leaf on a flag, is linked by convention with its object. We learn that a maple leaf stands for Canada. Symbols, therefore, are more conventional and their meanings are more open to connotative interpretations.

The relationship between the picture and reality, then, is not one way or the other; it depends upon the nature of the sign. Iconic and indexical signs are highly dependent upon resemblance and likeness; symbolic signs, however, depend upon conventional relationships that have to be learned. There may still be some learning involved in making the connection between the visual and what it represents, but with iconic and indexical visuals, the relationship is less arbitrary and more experiential. Arthur Danto (1992, p. 15-31) notes that in interpreting artwork, this ability to see the objects portrayed in paintings is not something we have to learn in the same way we learn to combine letters into words. Socially conditioned learning is more important for symbolic visuals which are highly arbitrary.

Figure 1
The Visual Continuum

iconic -> indexical -> symbolic

Resemblance or Convention

This debate focuses on whether the meaning of visual images is established through recognition or convention. This is really a question of how we "see" meaning in visuals, or how we process visual information. The focus of this question is on the operations used by viewers, not on the intentions of creators of images.

Convention

Some philosophers argue that all observation is theory laden. In other words, all observations are read in a code using conventions that the observer has internalized. Goodman (1976), for example, argues that visuals represent a code; like language, rules govern the code that controls these arbitrary relationships. The confusion comes because these rules and codes are largely internalized which make them look like natural processes. Goodman argues that pictures are just as arbitrary in their connection to what they represent as language is and that, therefore, a visual can serve as a picture of almost anything if a culture wills it so.

Natural Perception

In contrast, the objective view (sometimes called the naive or essentialist view) suggests that the way things look are taken to be objective properties of the visual world, waiting to be perceived by any passing eye. The camera, in this view, simply duplicates what the eye sees, the retinal image. As Wartofsky (1980a, p. 8) explains, "Thus it is tacitly assumed that the camera records 'objectively' the way things look, and that this sort of 'seeing' is indeed the duplicate of the eye's own work." Wartofsky does not recommend this view as he makes the point in throughout his work that what the viewer of photographs sees is in the eye of the beholder rather than in the lens of the camera.

But others propose a more sophisticated view of natural perceptual processing. A number of scholars believe that pictorial representation is a natural process that uses inborn perceptual processes to generate meanings. They believe people make the connection by seeing resemblances which are not arbitrary, but natural. Even though there is a learning process, it involves perceptual experiences rather than social or cultural conditioning. We recognize a picture of a squirrel because it has some characteristics in common with squirrels we have seen in our natural environment.

Catherine Elgin (1988) also says that pictorial representation is thought to be natural—a matter of resemblance between image and object. This resemblance, moreover, is taken to be an objective matter, visible to the human eye and evident to all who look. Linguistic representation on the other hand, is considered convention—working by rules and stipulations that secure the connection between words and the world. Richard Wollheim (1993) also notes a difference between words and pictures. In his view, words follow rules or conventions, however, pictures do not. He argues, for example, that the relationship between the word bison and the animal is arbitrary, not so for pictures.

Paul Messaris (1994) suggests that people make sense of pictures largely on the basis of their reproduction of real-world informational clues. While he does not subscribe to the objective reality view, he also does not believe that learning to make sense of visuals is comparable to learning to use language. He explains, "the representational conventions of images, unlike those of language, are typically based on informational cues that people learn to deal with in their everyday encounters with their real visual environments" (p. 27).

Esthetics scholar Arthur Danto (1992) also takes issue with the idea of convention and uses a number of experiments with the visual perception of animals (sheep, pigeons) to show that animals respond to pictures at a level far above flat stains of color. He believes that visual perception is much too important to animal survival to be deeply penetrated by theory (rules and codes). Pictorial competence is natural. Pictorial perception takes place at a level "beneath the threshold of interpretation:" it is external and purely associational. We don't have to learn to see. Danto suggests that because animals do not have the motor ability to draw, this may in some way affect how they perceive pictures (pp. 15-31)

Abduction

Another approach to understanding how we make sense of representations is Peirce's notion of abduction, which is a way of thinking based on hypothesis building and conjecture rather than formal deductive or inductive reasoning. Umberto Eco and Thomas Sebeok (1983) make the argument that the roots of abduction lie far back in time with hunters and trackers who could read the signs of nature, much as Sherlock Holmes does. Medicine, in its procedures for detecting symptoms is another area that uses abductive thinking. (Conan Doyle was trained in medicine and used one his medical professors as the model for Sherlock). Visual interpretation of representations may be described as abductive in that it begins with observing clues in the visual (perception) and moves to a conclusion by hypothesizing relationships and patterns (cognition, convention) through massive parallel processing. Abduction builds on natural perception at both the iconic and indexical levels and sets the stage for more complex forms of cognitive processing, particularly the type of cognitive and conventional processing needed to make sense of symbolic visuals. In this sense, abduction lies midway between natural perception and cognitive processing.

Information Processing

Gombrich's (1984) idea of "subjective vision" is not the same as the natural perceptual processing or conventional processing that have traditionally been the focus of the debate. His approach embeds representation in cognitive or information processing theories, and particularly schema theory, which explains how mental models and maps work. Critics of Gombrich's book, *Art and Illusion*, however, are concerned because he doesn't come down squarely in favor of natural perception. They seem to be arguing that Gombrich is saying that visual representation is all code and that notions of reality and of nature and mimesis have no place. All that remains are different systems of conventional signs which are made to stand for an unknowable reality—an out and out relativism (p. 195).

Gombrich (1984) rejects the idea of mimesis as based on the 'transcription' of nature and concentrates instead on the subjectivity of vision. He quotes another interpretation of his book by an archaeologist as seeing representation as the end product on a long road through schema and corrections. "It is not a faithful record of a visual experience but the faithful construction of a relational model" (p. 196).

Gombrich's (1984) subjective vision is based on the idea that we do learn to interpret visual effects, however, much of what we are interpreting reflects natural cues that we recognize as part of a larger schema. He points to the creation of certain visual effects which were discovered by trial and error in certain societies under the pressure of novel demands made on the image. This new emphasis on what might be called the 'trigger effects' of certain devices by which the image-maker can give the impression of depth, of sheen, or of facial expression has also enabled me to reformulate the problem of 'conventions' in representation. This processing of the patterns, however, is based on the recognition of visual elements which serve as the first step in relating an image to a meaning. He says to his critics: "...what would have been the use of talking at such length about 'schema' and 'correction' and 'making' and 'matching' if there were no standards whatever by which to correct or match an image?" (p. 197).

Many of these conventions—say the highlight or the streaks behind a figure to suggest movement—are rooted in certain easily acquired tricks which secure a given response that may be inborn or is very easily learned. Gombrich (1984, p. 198) suggest that we look for the roots of representation in biology and animal behavior and describes it as, "Our twin nature, posed between animality and rationality."

Marx Wartofsky (1980b) takes the information processing view a step further. He suggests that not only is our vision subjective, i.e. a product of the way we have interpreted things in the past, but it is also shaped by the process. Our representations, in other words, become maps for our seeing. He explains, "seeing the world perspectivally is the product of specific modes of visual praxis, and that perspective representation is therefore not a 'correct' rendering of the way things 'really look,' but rather a choice of seeing things in a particular way."(p. 132) He explains, "...to talk of the 'convention of linear perspective' in pictorial representation is not to talk of a simply arbitrary model of representation, but of a culturally achieved rule or canon of representation" (p. 133).

He argues that the way we have allowed the depiction of perspective to evolve now affects how we see perspective in real life. "To say that human vision is an artifact is to say that it is the product of human activity, and not simply of biological adaptation or natural selection....the activity is not arbitrary because it is guided by the teleological character of making, or construction. It is, however, conventional activity, and its products are conventional in the sense that they are the products of human choice and skill, and they are made for the sake of satisfying culturally and historically evolved and changing needs and wants" (pp. 132-133).

In an article on how cameras "see," Wartofsky (1980a) argues that our perceptual process is socially and culturally moderated: "The general thesis I am proposing is this: that human vision—visual perception, if you like—is an artifact. It is the product of our own making. Starting with the mammalian eye, in biological evolution, we have transformed visual perception by means of transformations of our visual praxis—the ways, or modes, of our visual activity. The instrument of this transformation is the pictorial representation." "We see by way of our picturing" (p.8).

"As we accept a style, or adopt a particular mode of pictorial representation—so does our actual perception of things change" (p. 9). He uses cave paintings to demonstrate. The mammoth doesn't appear in real life to have outlines around it although the cave painters drew it that way. "Yet we can all "see" the outline of a shape; We have no trouble visually abstracting from a living or even a moving subject, what its linear contours are. However, this is something we have learned to do visually by virtue of our practice of representing such shapes by means of drawn outlines. The caveman's art was revolution in many ways, but not least in that it created the visual ability to see such outlines in nature. The mammoth, so to speak, had no outline-shape for human visual perception until mammoth-drawings invented it." The choices we have made in representation (drawing, photography, lenses, etc.) are the "means of which we have created and transformed human vision" (p. 8).

This has been a debate about the type of processing—natural perception or convention—used to make sense of visual images. Even Wartofsky's and Gombrich's information processing viewpoint is criticized for not coming down strongly in one camp or another. We propose that all three viewpoints are right—that visual perception is complex and involves more than one kind of processing activities. The processing differences range from natural perceptual activities based on inborn experiential responses to the processing of conventions and arbitrary symbols and

Figure 2
The Processing Continuum

natural perception -> abduction -> convention -> cognitive processing

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then to more complex information processing activities that involve manipulating mental models of meanings. Wollheim (1993, p. 163) acknowledges that the relationship between natural and conventional processes is more like a continuum than a distinction. He observes that "the smaller the increment of information that a theory insists on if we are to move from knowing that something is a representation to knowing what it represents, the more "*natural*" account it gives of representation. The larger the increment of information that it specifies as requisite, the more *conventionalist* account the theory gives of representation."

Gombrich (1972, p. 89) also illustrates a unstated understanding of these two types of processing when he describes how we can classify theories of representation according to the naturalness that they assign to the representational relationship. He says that, on one hand, interpreting photos must be learned—interpreting photographs is an important skill that must be learned by all who have to deal with this medium of commun-ication: the intelligence officer, the sur-veyor or archaeologist who studies aerial photography, etc. However, he also says that "there is no doubt that organisms are 'programmed' to respond to certain visual signals in a way that facilitates survival." Gombrich refers to these at "automatisms" and cautions about comparing animal behavior to human reactions. (p. 85)

If we admit the idea that processing represents a continuum of increasingly more complex mental activities, then we might see the natural or perceptual approach that aims at recognition as the simplest approach followed by convention which demands a knowledge of rules and codes. The most complex form of processing then is cognitive which, as Gombrich describes it, is based on the interplay of perceptual and conventional activities.

A Theory of Representation

We mentioned in the beginning of this paper that Wollheim (1993) established two criteria for a theory of representation. It must answer the questions: What is it to represent? and What is a representation? That logic has guided this analysis of the points of view in the various debates which also seem to center on how representations work and their relationship to an object. Therefore, it is a logical next step to use this same schema to develop a model that represents a more inclusive way of describing representation.

Wollheim's (1993) psychological theory of representation spells out the nature of the resemblance relationship as well as the intention of the creator and the competency of the viewer. In his view of an object and its representation, "a necessary condition of R representing x is that R is a configuration in which something or other can be seen and furthermore one in which x can be seen. Sufficiency is reached only when we add the further condition that R was intended by whoever made it to be a configuration in which x could be seen. And this condition must be understood in such a way that whoever made the representation was in a position or had the required competency to form and act on this intention." In other words, Wollheim's account of representation invokes two psychological factors: the visual experiences of the spectator and the fulfilled intentions of the artist.

Gombrich (1972, p. 88) also speaks of the intention of the creator and how it relates to the viewer's perception. "However faithful an image that serves to convey visual information may be, the process of selection will always reveal the maker's interpretation of what he con-siders relevant....Interpretation on the part of the image maker must always be matched by the interpretation of the viewer. No image tells its own story." However, he also makes the point that these two do not necessarily match: "The information extracted from an image can be quite independent of the intention of its maker" (p. 87). Basically, he says that a picture is not a picture of everything that we can see in it. Some of the perceptions may be in error or idiosyncratic. The fulfilled intentions of the artist provide a curb on what we can see in a picture. Of course, the visible surface of the picture still bears the meaning.

In his analysis of the psychological approach, Gombrich (1972, p. 89) refers to the important role of the 'beholder's share:" the contribution we make to any representations from the stock of images stored in our mind, the "hidden assumptions" with which we approach an image. He concludes, "It's only when we lack memories that this process can't take place."

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Novitz (1975) pointed out that there is a difference between what a picture is and how it is used reflects the two sections of this review. The first discussion focused on how we derive meaning from visuals through three different types of processing—how it is used. The second discussion looked at the nature of the visual representation and its relationship with reality—what the picture is. In developing a theory of representation, we feel these two ideas can be brought together.

After reviewing the complexity of representation in terms of both the visual elements being represented and the processing demanded by their interpretation, we are able to map the field of representation relative to the nature of the visual and the type of processing. The following figure illustrates our view of the representation debate which we see as not being adequately articulated by either the natural, the conventional, the viewpoints. At the first level the process is one of recognition of iconic information using natural perceptual processes to identify things that have been seen before. The critical characteristic is resemblance and that can vary in terms of the amount of information required to establish resemblance. At the second level, understanding indexical meanings, as well as iconic, reflects a type of thinking identified as abduction. At the third level, the process is one of interpretation and the critical characteristic is the ability to learn arbitrary codes, rules, and symbols. The fourth level involves using all the tools of representation to aid information processing and to change the way we process visual information.

This presentation answers both questions that Wollheim said were necessary in a theory of representation: What is it to represent? (What is the relationship ...between the representation and the something that it is of?) and What is a representation? It does so by identifying two continua—the level of processing and the type of visual—and the relationships between them. The result is an analysis of visual representation in terms of four levels of complexity.

The first level which is focused on the recognition of iconic visual information represents the two viewpoints most commonly found in the literature. The second level which emphasizes indexical visual information is, as well as iconic, is a new way of looking at visual representation . The third and fourth levels are focused on the interpretation of meaning in more symbolic or arbitrary visuals. The fourth level is the one we have articulated based on the work of Gombrich and Wartofsky and which we feel depicts the most complex form of representation because it admits the possibility that the act of representing can actually change the subsequent perceptions of representations. All four levels are used as visual strategies for making sense of various types of visuals.

The value of this approach to a theory of representation is that, in admitting the validity of the different viewpoints, it

Figure 3
Mapping Representation

Type of processing	*iconic*	*indexical*	*symbolic*
Level I: perception	X	X	
Level II: abduction	X	X	X
Level II: convention		X	X
Level III: cognition	X	X	X

doesn't take any side in the various debates but instead makes an argument for the complexity of visual representation. In other words, they are all right—to a degree and in various situations. What is presented here is not a definitive statement one way or the other, but instead a map of the field of representation that acknow-ledges that there are differences in the types of representation and then explains how different processing approaches—natural perception, abduction, convention, and cognition are all important and used in different ways to derive different types of meanings from different types of visual representations.

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Student Nurses' Perceptions Of Hospital Staff Modeling Behaviors

by Sherise L. Valentine

Abstract

Modeling is the oldest form of visual communication. Visual literacy associated with modeling includes body language, facial expressions, and attire. As educators, our first responsibility to our learners is to provide them with the best learning environment possible. This study uses Brookfield's Critical Incident Questionnaire (CIQ) to assess the learning environment and student nurses' perceptions of hospital staff modeling behaviors. Results showed that students wanted the opportunity to create their own visual messages and that the learning environment was influenced more by hospital staff modeling behaviors than clinical instructor.

Introduction

As human beings, we gather most of our information visually. The scope of visual literacy includes body language, facial expressions, and attire. In fact, modeling is the oldest form of visual communication.

Nursing education, especially in the clinical area, relies heavily on modeling: The student observes the performance of a procedure, the student imitates/practices the procedure, the student performs the procedure in the clinical setting. "Before something can be learned, the model must be attended to; some models are more likely than others to be attended to such as those thought to be competent, powerful, attractive, and so on" (Merriam & Caffarella, 1991). Hospital staff nurses, working in the "real world", are viewed as such by students.

There are some differences between nursing theory in the classroom and nursing practice in the "real world". For example, nursing theory states that an IV needs to be changed every 72 hours. In practice, an IV is left in as long as it is patent if the patient has poor veins or is going home soon. Deciding which variations from nursing theory are acceptable or appropriate and which are not is not, and should not be, a student nurse's decision. These decisions are made by the clinical instructor or staff nurse caring for the patient, thus modeling professional nursing behavior. "Symbols retained from a modeling experience act as a template with which one's actions are compared" (Hergenhahn, 1988). Non-professional, unethical, inappropriate, and/or unacceptable decisions on the part of the hospital staff result in negative modeling behaviors and cause cognitive incongruence for the student. As educators, our first responsibility to our learners is to provide them with the best learning environment possible. "Teacher behavior is probably one of the most effective environmental interpreters, having the potential to enhance or destroy the environment for learning at the drop of the hat" (Heimlich & Norland, 1994). Yet, teacher/instructor behavior during the learning process is rarely assessed or evaluated.

Historically, assessment of the clinical environment has been from the instructor's perspective. The instructor would discuss concerns with hospital staff and administration with little or no input from the students. In addition, end of semester clinical evaluations focused on the clinical instructor and facility, not hospital staff nurses.

Even if final clinical evaluation forms were changed to include evaluation of hospital staff nurses, the information gathered would be after the fact and not helpful to that group of students. The same is true for any class where evaluation is performed only at the end of the semester. Adult educator, Stephen Brookfield, designed the Critical Incident Questionnaire (CIQ) to assess how students are experiencing their learning and the teacher's teaching as it happens (Brookfield, 1995). The CIQ is not copyrighted, and in fact, Brookfield encourages its use in all learning environments.

Every class and nursing clinical contains significant happenings that affect the learner's environment and hence learning and/or accomplishment. The CIQ gives the student an opportunity to share these moments with the instructor and their peers. This information can then be used to adjust the learning environment to better meet the class/clinical objectives and the learner's needs. An example of Brookfield's CIQ is shown in Figure 1 below.

Figure 1
Critical Incident Questionnaire

1. At what moment in the class this week did you feel most engaged with what was happening?

2. At what moment in the class this week did you feel most distanced from what was happening?

3. What action that anyone (teacher or student) took in class this week did you find most helpful or affirming?

4. What action that anyone (teacher or student) took in class this week did you find most puzzling or confusing?

5. What about the class this week surprised you the most? (This could be something about your own reactions to what went on, or something that someone did, or anything else that occurs to you.)

Purpose

In consideration of the above information, it seemed appropriate and necessary to evaluate the students' perceptions of the hospital clinical learning environment. Therefore, the purposes of this study were to: 1) identify students' perceptions of positive and negative influences in the clinical learning environment, and 2) examine students' perceptions of hospital staff modeling behaviors.

These purposes were accomplished by using a modified version of Brookfield's CIQ which substituted "clinical" for "class", "today" for "this week", and "instructor, student, or staff" for "teacher or student".

Significance of the Study

The data obtained from this study adds to the body of knowledge on visual literacy assessment techniques. Furthermore, this study demonstrates the importance of assessing modeling behaviors in the practicum setting.

Identification of negative modeling behaviors, as they are happening, holds the most promise for preventative measures before adverse templates are formed and the learning environment destroyed.

Methodology

Admission to the study was open to all students assigned to the spring 1995, Monday and Wednesday, medical/surgical clinical rotation at United Medical Center in Cheyenne, Wyoming. There were 18 Associate Degree nursing students in their second, third, or fourth semester of a four semester program in nursing. Participants were all female, between 20 and 45 years of age.

CIQ's were collected twice a week at the end of the clinical day. Responses were summarized weekly and given to the students to read and discuss in post-clinical conferences. All responses were anonymous and voluntary. Of a possible 169 responses, 117 CIQ's were received.

Data Analysis

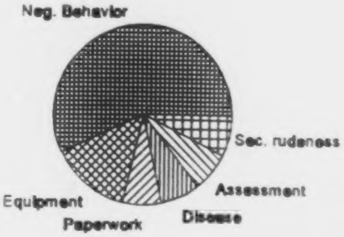
Eighty percent of the responses to the first question (At what moment in clinical today did you feel most engaged with what was happening?) identified hands-on patient care as most engaging. Fourteen percent of the respondents reported feeling most engaged while involved in patient, family, or peer teaching activities. Both of these categories represent the students' freedom to create visual-verbal messages through modeling professional nursing behaviors.

Responses to question #2 (At what moment in clinical today did you feel most distanced from what was happening?) further supported the students' desire to model professional nursing behaviors. Sixty-five percent of respondents felt most distanced when not involved in hands-on patient care, either because the patient left the floor or because the staff nurse took over the patient's care and excluded the student.

Again in question #3 [What action that anyone (instructor, student, or staff) took in clinical today did you find most helpful or affirming?] 85% of respondents identified modeling professional nursing behaviors by performing procedures, with verbal instruction/feedback, as most helpful or affirming.

The most puzzling or confusing actions listed in response to question #4 [What action that anyone (instructor, student, or staff) took in clinical today did you find most puzzling or confusing?] were negative modeling behaviors by hospital nursing staff (see Figure 2 below).

Figure 2
Most Puzzling or Confusing Actions



Students had a difficult time processing these incongruent visual messages. Starting IV's without washing hands or wearing gloves; not following hospital policy and procedures; and, socially biased and judgmental remarks during report conflicted with the students' pre-conceived professional nursing model.

Students were also puzzled or confused about equipment, meds, clinical paperwork/charting, the patient's disease process, assessment techniques, and secretary rudeness.

Negative modeling behaviors by hospital staff were also listed as most surprising in question #5 (What about clinical today surprised you the most?). Fifty percent of the responses reported surprise and disbelief at the negative visual messages being sent by hospital staff modeling behaviors.

What does this mean in terms of the learning environment, or providing learners with the best visual messages so that learning is not only facilitated, but also enhanced?

Implications for Practice

Judging from common themes in this study, students desire an opportunity to create their own visual messages through modeling professional behavior. In addition, preceptors have a great influence on student learning and the learning environment through their modeling behaviors/visual messages.

While nursing instructors are carefully screened for their positions, preceptors are not. In addition, nursing instructors must have advanced educational preparation, preceptors do not. Any discipline that places students in practicum settings may encounter similar issues.

Recommendations

It is therefore recommended that preceptors be carefully chosen, oriented, provided with ongoing support, and continually assessed. In addition, continuous, ongoing assessment of the learning environment is needed so that students have an opportunity to verbalize concerns related to visual messages they are sending or receiving. Brookfield's CIQ is recommended as an appropriate assessment tool.

Positive Outcomes

Positive outcomes of this study included: 1) Student empowerment. Instead of feeling victim to the learning environment, students saw positive changes which in turn positively affected their clinical learning experience. 2) Information from the CIQ's was used to implement change in the preceptor choice and education process. 3) Because the instructor was made aware of professional and ethical issues as they happened, negative modeling behaviors could be used as topics for discussion in post-clinical conferences. Students had the opportunity to role play, critically analyze the behavior in question, and problem solve. Finally, 4) As a result of this study, the clinical learning environment became more positive and supportive of the student.

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Quest of Visual Literacy: Deconstructing Visual Images of Indigenous People

Ladislaus Semali

Abstract

The purpose of this essay is to introduce five concepts that guide teachers' and students' inquiry in the understanding of media and visual representation. In a step by step process, I will show how these five concepts can become a tool with which to critique and examine film images of indigenous people so as to expose the oppressive spaces in the daily dose of media and visual messages designed to provide information and entertainment to credulous audiences. This essay aims to be a model for teachers contemplating to use such tools in their own classrooms to teach critical viewing, critical thinking, and critical reading skills.

Introduction

Critical inquiry is a term currently used among educators that sparks controversy. For some educators, critical inquiry reflects a new approach that allows teachers to construct pedagogical practices which connect with their students' experiences and provide students with a vision of social change by encouraging them to research their own topics and ask their own questions. This approach stands in contrast with teaching the classics and a canon of acceptable literary works far removed from the students' experiences to be memorized for exams. For many other educators, critical inquiry is another fad, a resurrection of old ideas growing out of a long history in education of creating new labels for old ideas without any real change in classrooms and schools.

Critical inquiry is not a fad. It draws from social theory studies of popular culture, the media in its many forms, literature, the role of the state in struggles over race, class and gender relations, national and international economic structures, and the cultural politics of imperialism and postcolonialism (Giroux, 1987; Giroux & Simon, 1989; McLaren, Hammer, Sholle, & Reilly, 1995). Simply put, critical inquiry means questioning. This practice of questioning requires both teachers and students to account for their own beliefs and practices by exploring the contradictions that are necessarily inherent in their own lives.

In the study of visual communication and visual literacy, critical inquiry is not used widely in classrooms as a tool for deconstructing visual images, particularly those images that represent people's culture, identity, or ethnicity. While this has began to occur in some schools, it is not yet common practice in all schools. With critical inquiry, students learn to become critical consumers who are aware of visual manipulation and stereotyping as an important project of critical literacy education.

In order to illustrate the current inquiry movement, I decided to apply the work which I and other university researchers in critical pedagogy have engaged in over the past 10 years. This method of inquiry is based on the rationale that if we hope to create media and visual environments that will help us change oppressive literacy practices, we have to think critically about what kinds of learning we want to go into the classrooms and the pedagogical spaces in which learning occurs for most students; how these literacy practices are projected or articulated with other social, political, and ideological forces.

Deconstructing Images of Indigenous People

In this essay, I introduce a discussion about the Sani. The Sani are the indigenous people of the Kalahari Desert in Southern Africa. These people have for many years been called the "bushmen", a derogatory name coined by early European settlers in the early 1900s. This name has been used until recently, when Namibia got its independence in 1990. The culture, language, and social life of the Sani has been represented in the film: The Gods Must Be Crazy (1984). As the name "bushman" suggests, the Sani have been portrayed in this film as a creature of the Stone Age that persists to be an obstacle to progress, civilization, and modernization.

In the powerful visual and humorous images of The Gods, a South African writer-director, Jamie Uys, makes jokes about the absurdities and discontinuities of African life. He portrays the Sani culture as primitive, the environment in which they live is labelled as paradise on Earth, and their entire existence seems to clash sharply with "civilized" societies predominant in large cities and in Western Europe. In this pixilated absurdity, Uys wrote, produced, and directed The Gods, in which three divergent plot-threads are arbitrarily braided into a whole.

By bringing the discussion of the film about the Sani to the foreground, I expose the mistaken popular beliefs commonly portrayed about Africans in movies and television, especially in Travel, National Geographic, or Discovery films. This humorous anthropological story does not only show how different cultures perceive the same things in totally different ways, but it does so in a shameless manner.

A critical examination of The Gods Must Be Crazy coincides with the critical approach to inquiry made explicit in this essay. This approach provides a systematic educational model with which to read critically visual images of women, minorities, people from other cultures, ethnic groups, and images of other social groups embedded in media and visual messages, in order to recognize stereotypes, ethnocultural bias and discrimination, and to understand how these images help to structure our experience. The value of such critical pedagogy rests with the belief that visuals impart knowledge and can entertain while leaving permanent images on impressionable minds (Giroux & Simon, 1989). In his book, Return of the Repressed Media Studies, Stuart Hall reminds us that media (and indeed visuals) play a significant role in the creation and reinforcement of specific images of the world, the manufacture of consent, and the positioning of political economic interests (Hall, 1982).

In the study of visual representation in films, the complex issues surrounding culture, identity, and ethnicity are brought to bear. The dominant visual techniques and coding devices employed by the producer of The Gods, to convince viewers of the accuracy or believability claimed in the story, combines the Hollywood classic cinema with ignorance associated with remote area groups (Bordwell, Staiger & Thompson, 1985).

Watching the film prompted me to think about its underlying messages in relation to other films I had seen, and caused me to wonder if the politics and representations in The Gods had also been in other films about Africans. The continued reassertion of white racial hegemony and patriarchy seems to be most explicit in this film. Equally, the nature of the reality constructed by the film and the values implicit in its visual representations are wittingly intertwined with humor and cannot be taken for granted.

Readers may be troubled in two contrasting ways: on the one hand, some who are shocked by the obvious racism of the film may wonder why I worry about basic principles of visual representation; on the other hand, many may wish that the questions I pose could just be ignored, simply because, in their opinion, the film was only a piece of art and entertainment -- why not just follow one's pleasures and savor the riches that the world of narrative provides? Unfortunately, there are many sides to any piece of art!

Because all media and visual productions are produced from a variety of motivations, such underlying motives need to be questioned. Perhaps if we can find a responsible way of defending the ethical criticism of narrative, we will encourage similar probing in the other arts that I must neglect here. We are reminded of Andrew Bergman's study of the Depression in America and the movies, where he argued

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that every movie is a cultural artifact and as such reflects the values, fears, myths, and assumptions of the culture that produces it (1971). In the pages that follow, I show that The Gods is indeed a product of such myths and fears.

In his essays on representation, Richard Dyer (1985) quipped: "how we are seen determines in part how we are treated; how we treat others is based on how we see them. Such seeing comes from representation" (p. 39). In order to question visual representations, as suggested by Dyer, it is important to adopt a systematic mode of inquiry. By using the following five concepts for inquiry about visual representation, issues of diversity, and the inequalities in knowledge and power that exist between those who manufacture information in their own interests and those who consume it innocently as news and entertainment are systematically and critically questioned.

Five Concepts for Critical Inquiry about Visual Representation

Visual representation refers to the way images and language actively construct meanings according to sets of conventions shared by and familiar to makers (producers) and audiences (viewers). As a visual representation of storytelling, films share much in common with the historical or fictional narrative, including plot, theme, character, setting, conflict, and resolution. Through the maneuvering of camera angles, cutting, and lighting, the manipulation of time and space is effectively accomplished to give the viewer a sense of realism. For this reason, such ploy of visual representations of people demand a careful analysis to discover (1) what is at issue, (2) how the issue / event is defined, (3) who is involved, (4) what the arguments are, and (5) what is taken for granted including cultural assumptions (See Figure 1). In short, a systematic mode of inquiry will focus on the visual, source, origins, and the determinants of media and visual constructions, all of which are carefully put together to influence the viewer in a certain way. Adapted from Werner and Nixon's guide for teaching critical mindedness, these five concepts provide an important starting point for critical inquiry (Werner & Nixon, 1990). How might one apply such a critical inquiry to visual representations of the Gods Must Be Crazy?

What is the issue?

We must ask: What context motivated the production of The Gods? By questioning the production and construction of the meaning-making processes in visual representations, we will examine closely the visual imagery and popular representation of people which help shape their personal, social, and political worlds. In thinking about "what is the issue," I aim to direct attention towards the broader issues: (1) what sense do representations make of the world? (2) what are the visuals representing to us and how? In other words, how do the individuals represented in the film become seen or how does the way we see them influence how we treat them? (3) what are typical representations of groups in society? (4) what does this example of visuals represent to me? (5) what do the visuals mean to others who see it?

To decipher The Gods Must Be Crazy as a visual representation of culture, identity, and ethnicity, it is necessary to know something about South Africa's past history, its present domestic and foreign policies, and the singlemindedness with which South Africa before independence, used the system of apartheid to shape its future. Within its borders, South Africa had for almost four decades been creating a new territorial and demographic entity. Although we tend to hear only the pretty aspects of apartheid, its greatest manifestation was the manipulation of people within a finite space. As it has been acknowledged by several reviewers of this film, The Gods is an expression of this aspect of apartheid (Brown, 1982, p. 42); Denby, 1984, p. 47); Davis, 1985, p. 51; Keneas, 1984, p. 22). Accordingly, the film delves on this aspect of racist apartheid by inversion.

Figure 1
Critical Inquiry Questions

#	Inquiry	Key Questions
1.	The Issue	• What is the issue? • What sense do media make of the world? • What do visuals mean to those who see them?
2.	Definitions of the Issue	• What is the source of information? • What form does the issue take? • What information is left out?
3.	Who is involved	• What groups are involved? • Who is the media intended for? • Whose point of view does the media take?
4.	The Argument	• Why was a certain media were selected? • What information in the visual is factual? • How is the message affected by what is left out?
5.	The Assumptions	• What attitudes are assumed? • Whose voice is heard? • What points of view are assumed?

While the landscape of The Gods looks to be very much like South Africa, it is set in what some critics call the mythical country of Botswana. Because Uys' Botswana does not exist, except in his imagination; features of the landscape, dress, and custom are not to be found in real Botswana. Uys' Botswana is instead a dream of a happy-go-lucky bantustan, those equally fictitious homelands that the South African government tried to create all over South Africa, literally out of dust, for the dumping of African people. Clearly, the central issue posited in the film is about value questions defined by the film-maker's goals, ideals, and hopes. As always, the contention or challenge therefore is to recognize that many of the things of value to me are not necessarily valued to the same degree by other people.

How the Issue / Event is Defined?

As we consider how the event is defined, several questions come to mind: (1) what is the source of the information? (2) what form does it take? (3) how does the form shape my understanding? (4) how does it serve or not serve my purposes? (5) what information is left out?

The first ten minutes of the film addresses the relationship between illusion and reality. "It looks like a paradise, but it is in fact the most treacherous desert in the world, the Kalahari." We see footage of the placid Kalahari "bushmen" searching for water. In this desert we meet the "dainty, small, and graceful Sani ("bushmen")." We're unsure of the film-maker's intent, suspecting satire, but the sequence turns out to be a fairly predictable documentary with dry, straight-faced narration about a peaceful, "primitive" tribe of tiny "bushmen" who live in a gracious, simple world digging for roots and foraging for berries, without any knowledge of crime or violence. A Coke bottle drops from a great silver bird in the heavens and into the orderly lives of the nomadic "Bushman" Xi and his family. The bottle, as it soon turns out, is a gift from the gods. You can blow on it and make a windy music, you can roll it and crush millet. Pretty soon comes arguing over the bottle's possession followed by acrimony, anger, and fights. The story about the Sani is being narrated and defined by an outsider who does not include the point of view of those whose story is being told. In this narration, the culture of the Sani and that of other African societies is presumed to be a quaint relic of the past rather than vibrant contemporary culture.

One might ask: Who are these "gods" who are crazy? They are the technologically advanced whites whose very garbage is a source of wonder to most of the developing world! In their simple wisdom, the Sani come to reject what white society has to offer, symbolized in the discarded bottle. This very rejection is a sop of white angst, because it means that the Sani do not covet the white standard of living, and so cannot be considered rivals--for South Africans, the ideal state of affairs. However admirable, the kind of decision this rejection represents is completely absent from the everyday lives of the indigenous peoples of South Africa. If there is one overwhelming fact of the dispossessed Tswanas, Zulus, Xhosas, and Sani, as it is for many Africans, it is that they have no control whatsoever over what they can accept or reject. For most Africans, the decision continues to be made by outsiders and that decision has never concerned itself in the least with what the African wants.

It would be curious to know how much Xi was paid for acting in the movie. Did he ever see the movie? What did he think of it? Has he read some of the raving reviews about his movie? Will he read this article? These rhetorical questions are simply an illustration of the predicament in which the continent of Africa lies in relation to the rest of the world. Like many Africans, the media are still out of reach and will be so for many years to come. Poverty is rampage; amenities of the modern world like telephones, electricity, plumbing, or simple, permanent housing is a dream for many indigenous peoples who live in remote areas and out of the urban circle. Why is it this way? The context within which Gods was made is not given anywhere in the production of this film.

Who is Involved?

As we explore "what groups are involved", our attention is drawn to two important questions: (1) who is the target audience? (2) what point of view is present? The idea of interest helps us to be critical of how a particular representation, issue, or event may be biased. Less obvious than identifying the filmmaker may be the fact that his reasons or arguments could be self-serving, designed largely to protect or enhance the invested interest or dominant perspective in some way. A vested interest includes any privilege that a group enjoys and considers their "right." Arguments may be designed to protect or enhance this interest -- whether position, benefit, status, or credibility -- perhaps at the expense of an opponent who is made to look foolish, selfish, stupid, immoral, uninformed, or downright perverse.

In the film The Gods Must Be Crazy, the filmmaker uses a narrator to guide the viewers and intones who and what is important. Some people are cast as victims; others as heroes. An ethnocultural bias runs throughout the plot. This bias portrays Africans as childlike, incompetent, and unscientific. This bias reinforces a long-standing myth about Africa - the Dark Continent. Even though the theme of this film may pretend to portray a simplistic tale of the search for the tranquil life and to satirize white urban living, beneath that tranquil life lies a parable about white South Africa with its basic values; those values of the privileged, for it is only those content with the world's goods who can afford to poke fun at them!

Who is in the film? The film's story is made of a number of intertwining plots. The first story involves Xi, the so-called "Bushman." As Uys shows it, the life of the "bushmen" is idyllic, completely in harmony with their environment, living communally, until a careless aviator throws a Coke bottle into their midst. In another subplot, set in a neighboring African-governed country, a revolutionary Sam Boga attempts a coup. He is unsuccessful, and together with his followers flees into Botswana. A third

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subplot involves a white teacher who suddenly gets bored with her meaningless job in a city office and takes a job as a teacher in an African school in Botswana. There she meets up with Andrew Steyn, a shy, awkward biologist who eventually wins her. These three plots fuse at the resolution, when the African revolutionaries seize the white schoolteacher and her African pupils as hostages, and they are rescued by the biologist and Xi working as a team.

For many people, Africa is not a place but a state of mind, the heart of darkness. Africa has never been dark, however, to those who live there. It is ignorance on the part of the outsiders that was, and continues to be, dark.

The great tradition that Gods draws on is the journey through Africa. Not the sort of expedition where you hunt for animals, but the missionary journey where you hunt for the souls of human beings. When applied to white South Africa before independence, the notion of "missionary", someone with a mission, derives new meaning! This "mission" is essential to the white mans's view of Africa. To Africa, Europe sent its missionaries, including its fanatics. The Afrikaner, the white man in that part of Africa we now call South Africa, decided early on that his mission was to bring the message of the bible to the wilderness. Unlike Dr. Livingstone's ambition to bring the Word of God to the people of Central Africa, the Afrikaner had no desire to share that Word with the kaffir, the unbelievers, for Afrikaners were God's Chosen People, and the Chosen do not share with the unchosen, for then how would you tell the difference (Davis, 1985, p. 51)? In the middle of this century, the Afrikaners' mission came to mean the protection of White Christian Civilization (i.e., the privileged against the Africans and Communism). In Uys' film, these two -- the Africans and Communism -- are personified by Sam Boga and his guerrillas.

A figurative interpretation of the plot, then, reveals that Africans are like children who are easily led astray by outside agitators (i.e., the African liberationists). When this happens, the threat is not only to Africans but also to the white race personified by the heroine. To save Africans and Europeans alike, white organizational skills must mobilize all indigenous peoples and even African nature itself (in the shape of a poisonous bush). As the film illustrates, Andrew Steyn, the pacific, unworldly scientist--the personification of a technologically advance but nonaggressive South African--beats all the odds.

What are the Arguments?

This question drives the core issues of inquiry. Besides looking at what groups are involved in the film, an examination of the arguments postulated in the film reveals that The Gods has a strong point of view! What arguments enhance the interests of its dominant side and what arguments detract from the credibility of the other side? More specifically, students and teachers must ask the following critical questions:
(1) why was a particular visual image selected? (2) what information presented in the visual image is factual? (3) what portion of content is inaccurate? (4) why are shots/camera work arranged that way? (5) do visual images match narration? (6) how does sound affect visual images? (7) how is repetition of visual images, and text used? (8) how do graphics affect the message? (9) how does stillness or motion aid the message? (10) what is left out? (11) how is the message affected by what is left out?

It is important to look at how the visuals are manipulated in this film. For example, after about six minutes the film cuts to a big city, where we are introduced to "civilized man." Civilized humans, we are told, managed to make their lives more complicated by trying to make them easier. By contrast, the "bushmen" have a very simple life--until the Western world intrudes upon it.

The mission of Andrew Steyn, the biologist, is scientific discovery, in the innocuous form of examination of elephant droppings. Xi's mission, however, is the preservation of the way of life of the "bushman."

The arguments are made through anecdotal stories of the way the people in the film go about doing their everyday work. Here, the underlying platitude by which most South Africans rationalize their relationship with Africans comes to the surface: "Africans are like children." In the film, they are children. By introducing the guerilla fighters, the film shows that their own government, being African, cannot be relied upon to protect them. They must be rescued by the ingenuity of a white man in collaboration with Xi the "Bushman."

All these people scurrying around the landscape of southern Africa, colliding in pratfalls, constitute a distorted microcosm of the class of peoples and ideologies that is in reality deeply tragic. What Uys has done in the film, in fact (albeit a fact disguised by humor), is to create in Gods the imaginary land that the architects of apartheid would have us believe in, where South Africa's intentions are the good for everyone. In this land of make-believe, entire villages drop their work and turn out to sing a hymn of welcome to a white teacher. This gesture depicts the relationship of Africans towards white people is gratitude for the help being given, of whites towards Africans, protective paternalism. This peaceful, dependent relationship would continue were it not for the advance of the guerrillas.

What is taken for granted?

To examine what is taken for granted in any text requires that viewers and readers question some of the cultural assumptions. The ways in which visual media constructions are read or evaluated by audiences in America are often not questioned enough. For example, different disciplines of science measure Africa in different ways: Geographers point to a climate that ranges from the burning Sahara, to the steamy rain forests of Zaire, to the dry savannas of Kenya. Biologists note the astonishing abundance and variety of the continent's wildlife, with a particular mention of Tanzania's Serengeti and the Ngorongoro Crater. Epidemiologists speak with horror of deadly viruses like HIV and Ebola that are presumed to have come out of the jungle, and countless undiscovered microbes waiting to emerge.

For Anthropologists, Africa's most impressive statistics are the ones that measure the enormous diversity of its indigenous people. The diversity of the different African societies, from Ashanti to Zulu, and their customs provide a rich heritage more than a deficit culture. With varying histories, cultures and living, these indigenous peoples have lived on the continent for centuries and are spread over 50 independent countries. A majority of the indigenous people includes pastoralists, agro-pastoralists, hunters, and gatherers. Some 1,300 languages are spoken on the continent, about a third of the world's total. Each language represents a distinct indigenous group with its own beliefs and its own rituals and ceremonies -- some of which have been performed for hundreds of years.

For the media, however, Africa is often misunderstood because of western media's dismissal of the continent as backward and therefore unworthy of coverage, until disaster strikes like in the case of the recent famine in Ethiopia, Somalia and Rwanda. What is not portrayed is that Africa is a diverse continent, both of re-emerging democracies and of troubled areas with leftover vestiges of colonialism, and is made up of many countries, climates, geographies, histories, and peoples.

By now, it is common knowledge that Africa overflows with indigenous forms of communication: theater, drumming, dancing, traditional storytelling, and village meetings which have informed and entertained for centuries. And yet, in the past 30 years, however, the continent has been inundated with radios, televisions, VCRs, and other western products. This state of affairs makes Africans "knowledge colonies." Most African states, apart from South Africa, are too poor to compete with European and American economies in terms of media production and dissemination. The reliance on the West for all but local news results in reduced and distorted coverage of Africa consistent with the legacy of colonialism as portrayed in The Gods.

Tanzanians, for instance, get news about their neighbors, the Kenyans, from the western media. Nigerians learn about Tanzanian events from the British Broadcasting Corporation (BBC). All over Africa the pattern is the same. The image we see in the United States, the corrupt, incompetent, starving, dependent, hopeless Africa, is the image manufactured in the West and transmitted to Africa, although there are pockets of resistance to this inundation by western media. Raised on a diet of Westernized history, Tarzan books and films, and sensationalized news media, many students in the United States believe Africa to be a primitive land of hot, steamy jungles inhabited by wild animals and savages. This myth is normalized and reinforced by The Gods Must Be Crazy.

Even though present day technological changes have brought far reaching structural changes in industrialized countries, particularly in the area of production and distribution of information and literacy materials, the situation in Africa and much of the developing world remains a challenge. Communities in metropolitan cities like Dar es Salaam, Johannesburg, Lagos, and Nairobi look to the communities of Los Angeles and New York with awe and wonder, imitating their music and fashion, and craving for the instant gratification and escape that movie entertainment has to offer.

However, unequal representation of news and events of non-western societies persists. African media outlets on the continent lack the technology and speed to generate reports or images of its people fast enough for the world beyond their borders. And yet, western media portray Africa as just one massive civil war, a famine-torn place with a few pyramids in the north, racial struggle in the south, civil wars, and some lions and elephants in between.

The reality about Africa has been distorted among non-Africans. For centuries, starting with perceptions of the remote "Dark Continent", the worldview of many non-Africans, particularly Europeans, was clouded over with myths and stereotypes, and Africa was misconceived then as now with all the myths and stereotypes intact. Some of the simplest myths are most common: lions in the jungles, the isolated Dark Continent, inferior savages, a race of Negroes--heathens developed only by the grace of God and the White man--, and a land of turmoil, incapable of self-government. Because these myths and stereotypes are alive today in the schools' curriculum (however unintentional the distortions and omissions may be), in the hands of unaware and unskilled teachers, the curriculum continues to feed the racist doctrines and practices of white superiority and privilege.

Conclusion

In this essay, I have tried to illustrate that the production of meaning from media and visual texts about what is important to know depends upon knowledge which is shared by a community. Such knowledge is constructed by individuals' belief system, their worldview, their use of language, and by the way they construct representations of self, others, and of the physical and societal environment.

One major aspect of teaching visual literacy is to identify where that knowledge represented in the visual comes from, and how it is constructed. How did we come to know what we know about a certain event, or group of people? Where did the perceptions we hold about Africans or certain ethnic groups come from? By posing these questions, the various assumptions underlying the production values of dominant news and entertainment media are investigated and critically evaluated.

The five concepts for critical inquiry about visual representation outlined in this essay cannot claim to substitute or uproot the century-old myths and stereotypes about Africa and the African people. These concepts, however, provide a framework to question such myths and stereotypes, which have to a large extent been created in literature, media, and cinema. By using these concepts in critical inquiry, we also examine the ways in which the language of visuals is socially and historically produced.

Therefore, students need to be encouraged to question the clarity and strength for reasoning, identify assumptions and values, recognize points of view and attitudes, and evaluate conclusions and actions provided by all narratives whether they be picture books, short stories, poems, plays, film, and pieces of nonfiction.

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Exploring Children's Spatial Visual Thinking In An HyperGami Environment

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Abstract

The purpose of this study is to investigate children's spatial cognition in the microcomputer environment created by HyperGami. The results of exploratory study suggest that HyperGami is a rich environment for developing spatial visual thinking skills.

Introduction

Can computer environments nurture spatial visual thinking? From a constructivist perspective, spatial cognition develops in the course of active involvement with the environment by the child who must assimilate and accommodate experiences into existing schemata (Piaget & Inhelder, 1956). Papert used the computer as a medium to pioneer such an environment when he created LOGO - which he described as a microworld where students can formulate and test theories (Papert,1980). Numerous programs now purport to be microworlds which users can visit and explore. But, could such an environment nurture spatial visual thinking?

Clark (1983) cautioned against over generalizing the effect of the computer (or any medium) on instruction and stated that "the best current evidence is that media are mere vehicles that deliver instruction but do not influence student achievement any more than the truck that delivers our groceries causes changes in our nutrition."(p.445). Clark called for a new theoretical model to guide technology research. A decade later Kozma (1991) outlined a framework which builds on the idea that the learner actively collaborates with the medium to construct knowledge rather than having the learning "delivered" via some medium. Kozma argues that each medium has unique characteristics in terms of how it is used, the symbol systems employed and the cognitive processing capabilities required and states that "ultimately, our ability to take advantage of emerging technologies will depend upon the creativity of their designers, their ability to exploit the capabilities of the media, and our understanding of the relationship between these capabilities and learning"(p.206).

The explorations reported in this paper investigate children's spatial cognition in the microcomputer environment created by HyperGami.

Why Spatial Visual Thinking?

As early as 1957, the U.S. Employment Service listed performance on spatial ability tasks as a predictor for success in occupations including all classes of engineers and draftsmen, architects, cartoonists, mathematicians, scientists, an virtually all medical personnel. Studies followed which demonstrated high correlation between performance on spatial ability measures and success in art (McWhinnie, 1994), science (Pallrand & Seeber, 1984; Gimmestad, 1984; Pribyl &Bodner, 1987), and mathematics (Battista, 1990; Fennema & Sherman, 1977; Guay & McDaniel 1977).

Studies of the brain and cognition have resulted in calls for educators to recognize and nurture "multiple intelligences" (Denkla, 1991; Gardner, 1993; Lazearz, 1994). Spatial visual thinking is an area of cognition which often receives little formal attention in our school systems. The computer is a medium with capabilities for creating dynamic microworld environments where children have control over actions and can formulate and test theories and strategies which require coordination of horizontal and vertical axes as well as mental manipulation and rotation of objects through space. In fact some evidence exists that many computer applications require some degree of spatial cognition. Norman (1994) thought that computer-based technology might amplify individual differences and tried to find the major sources driving differences in performance. He described a high correlation between spatial visualization ability and computer performance. Vicente, Hayes, and Williges

(1987) supported Norman's theory. They investigated 21 predictors of performance in finding information in a computerized database. Only spatial ability and vocabulary accounted for significant unique portions of the variance. Moreover, the spatial ability predictor was the most influential.

What is Spatial Cognition?

Various classification schemes have been used to describe components of spatial visual thinking. After an extensive review of studies relating to human spatial abilities McGee (1979) described two categories of spatial cognition. These are spatial visualization and spatial orientation. Spatial visualization involves mentally rotating, manipulating and twisting two and three dimensional stimulus objects. Spatial orientation with respect to one's own body involves the ability to remain unconfused by changing orientations of spatial configurations. According to John Eliot and Ian Macfarlane Smith (1983), spatial ability refers to "... the perception and retention of visual forms and the mental manipulation and reconstruction of visual shapes" (p. 12). A similar definition is found in Linn and Peterson (1983). They defined "spatial ability as representing, transforming, generating, and recalling non-linguistic information" (Linn & Peterson, 1983). Spatial ability has been thought of as a domain of abilities rather than a single ability or skill (Pellegrino & Hunt, 1991). Spatial ability is generally identified as having three major factors: spatial perception, mental rotation, and spatial visualization (Linn & Petersen, 1985). Spatial perception is an ability "to determine spatial relationships with respect to the orientation of their own bodies, in spite of distracting information" (Linn & Petersen, 1985, p. 5). Mental rotation is the ability "to rotate a two or three dimensional figure rapidly and accurately" (Linn & Petersen, 1985, p. 7). Spatial visualization is a more complex ability than the other two major factors. Spatial visualization refers to spatial ability tasks that "involve complicated multi-step manipulation of spatially presented information" (Linn & Peterson, 1985. p.9).

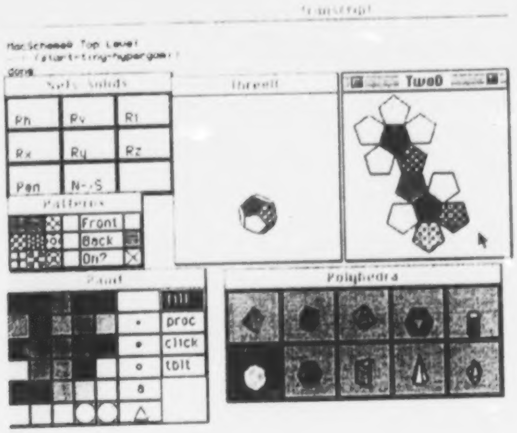
Ongoing research efforts suggest that students' performance on spatial ability measures can be improved by practice or training. Piaget and Inhelder (1956) said children's spatial cognition develops when they are actively involved with the environment so that they assimilate and accommodate new experiences into their existing knowledge. Ben-Chaim et al (1989) found from their research that suitable intervention has great success for improving spatial visualization. They suggested that "spatial visualization training, in particular concrete experiences, should be a part of the middle school curriculum". Brinkmann (1966) found that a complex spatial test is substantially improved after training in geometry that was directed to emphasize visual/imaginable aspects of geometry. However, simply learning geometry focusing on logical proofs has no impact on spatial ability according to Brown (1954).

McClurg and Chaille (1987) and McClurg (1992) investigated the effects of computer games utilizing spatial skills on the development of spatial ability. Both studies found that males and females improved their scores on a spatial ability measure after playing with computer software. McClurg and Chaille (1987) stated that in order for a computer game to encourage spatial cognition, it must provide an environment where children are active participants. Norman(1994) also reported that computer interfaces allow the user to perform spatial and intermediate operations on the interface rather than in the head are among the most favorable designs for developing spatial ability.

HyperGami

A recent computer application called HyperGami (Eigenberg & Nishioka, 1995) allows students to design, decorate, explore, and manipulate a two-dimensional net made up of polygons and the associated three-dimensional solid. A "net" is the shape that would result when all the sides of a polyhedron are unfolded. A "solid" is the shape of three dimensional polyhedron. The program allows students to view various kinds of polyhedra, and to select one. When the polyhedron has been selected, a "3-D" picture of the polyhedron appears on the screen as well as a 2-dimensional folding net (Figure 1).

Figure 1
HyperGami Window



Thus students can see how the three dimensional object can be unfolded and vice versa. Students have various methods available to decorate the net. They can fill each polygon with a solid color or make patterns with color. Students can also write and make their own designs on the folding net. Hence the degree of sophistication with which a student decorates the folding net depends on both the student's interest and ability (Eigenberg & Nishioka, 1995). Students print out the polyhedra they created on paper, cut and fold to make solid, beautiful "objets d'art". The act of exploring the nets of many kinds of solids and then having opportunities to fold these nets into various complex geometric solids is in alliance with the constructivist perspective, i.e. that spatial cognition develops in the course of active involvement with the environment by the child. Eigenberg and Nishioka (1995) believe that students can best understand three-dimensional geometry by actually holding and manipulating shapes. HyperGami provides an environment in which students are actively involved since they manipulate computer generated graphics physically as well as mentally.

The importance of polyhedra as a means of developing spatial ability as well as developing mathematical skills has been studied. Early in 1948, Piaget and Inhelder stated the importance of the development of geometric concepts in children. They found that the child who is familiar with folding and unfolding paper shapes through his work at school had much better performance in imagining and drawing the nets of simple shapes than children who lacked this experience. Peterson (1988) emphasized polyhedral models as a motivational value. He said polyhedral models can act not only as tangible mathematical diagrams, but also as objects having artistic and motivational value.

HyperGami allows students to have experiences with nets and solids mentally and manually. These activities are related to spatial visualization ability. The folding or unfolding of flat patterns and imagining objects and changes to objects in space requires spatial visual thinking. HyperGami provides an environment for users to improve spatial visualization ability among three major areas of spatial ability. The explorations reported in this paper investigated students' spatial visual thinking while working with HyperGami.

Methods and Measurement

A sample size of twelve subjects was used for this exploratory study. The subjects were students in the University of Wyoming Laboratory School and the grade levels included sixth through ninth grade. There were seven boys and five girls and they all had volunteered for this study as an elective course. The subjects were divided into three groups. Each group was led by one of three investigators. Each group was given a pretest and a posttest designed to examine students' spatial visualization thinking. Every Friday over a period of 6 weeks, subjects interacted with HyperGami for one hour. During the sessions subjects selected polyhedra and decorated the nets with different colors and patterns. While subjects decorated the net, they could observe its solid on the same screen. Subjects also folded the polyhedra. Subjects started with simple polyhedra such as the tetrahedron and cube and later tried more complicated ones such as the archimidean solids. Subjects also explored truncation of some polyhedra. A description contrasting procedures used in each of the explorations is included below.

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Exploration 1

The students in this study were two sixth grade boys and two sixth grade girls. The students were given a pretest and an identical posttest and the results of the tests were compared. A variety of geometric solids were placed on the table. Students were given five minutes in which to examine the solids. Then only ten of the solids were placed on a table in a line. Students were given a paper on which was exhibited the folding nets of these solids along with several patterns involving polygons that were similar in appearance to the folding nets. The polyhedra whose nets were pictured on the paper were the cube, tetrahedron, cubeoctohedron, octohedron, three-sided prism, ten-sided antiprism, dodecohedron, and icosohedron. A six-sided and a ten-sided prism were in the line on the table also but their nets were not pictured on the paper. (See Appendix A). Students were asked to match the solids with their folding nets on the paper without manipulating the solids.

On the test there were two types of correct and two types of incorrect responses. If the student correctly matched the solid with its net it was called a correct match. If they recognized that the six and ten-sided prisms' nets were not pictured, it was considered a correct nonmatch. Conversely, if they incorrectly matched a solid with the wrong net, it was an incorrect match. If they matched a six or ten-sided prism with a net, that was an incorrect nonmatch. If they did not assign a net to any solid whose net was pictured, it was also considered an incorrect nonmatch. The results of the pretest and the posttest are summarized in Figure 2.

Figure 2
Pretest and Posttest

possible 8 2

	Pretest				Posttest			
	Correct		Incorrect		Correct		Incorrect	
Subject	M	NM	M	NM	M	NM	M	NM
A	2	0	6	2	3	0	5	3
B	5	1	1	3	5	2	1	2
C	5	0	3	2	5	2	1	2
D	5	2	1	1				

As is shown the total number of correct answers increased for all the subjects who took the posttest. (Subject D was absent the day of the posttest). In particular, subjects B and C recognized that the two prisms' nets were not pictured. On the posttest, subject A correctly matched the cubeoctohedron and subject C correctly matched the dodecohedron. They had not matched them correctly on the pretest. However on the posttest, subject A again tried to find a match for all the polyhedra and subject B made an incorrect match for a match that was correct on the pretest. However, the number of correct scores increased for all. In particular, since two of the students recognized that two of the patterns were not there, this may indicate growth in their spatial visual thinking.

Exploration 2

HyperGami provides an environment which engages students in spatial visual thinking. Additionally, the user must manually manipulate the nets to produce a 3-D "hard" copy. Users cut, fold, and glue nets to make solids with their hands. This exploration investigated students' spatial visual thinking and examined the possible role of manual dexterity as students interacted with activities in HyperGami.

The subjects in this study were a sixth grade boy, a seventh grade girl, a seventh grade boy, and a ninth grade boy. Performances of pretest and posttest were compared. In pretest and posttest, subjects were given two nets on paper, a cube and a complex net (Appendix B). Before folding each net, the subjects were asked to predict the three dimensional shape the nets would become. All subjects recognized the cube from the net. For the cubeoctohedron, they said that they had no idea. Subject A who finished first said, "I can imagine the shape".

Subjects were then asked to fold the nets. While they were folding each net, an investigator measured the amount of time the subjects spent and observed their behaviors. Figure 3 summarizes the results.

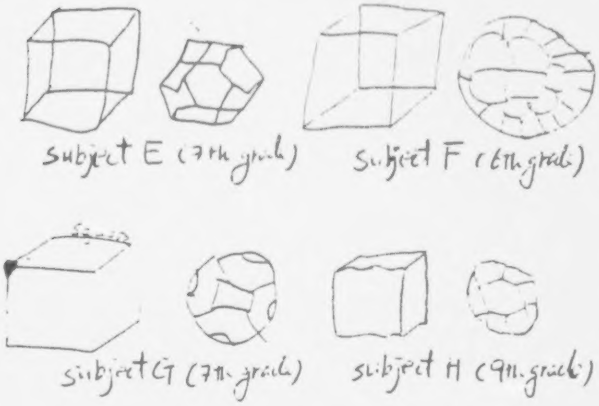
Figure 3
The amount of time to fold each net (in minutes)

	Cube Net		Complex Net	
Subject	Pre	Post	Pre	Post
E	2	1.83	5.17	4.5
F	2	1.83	5.5	4.08
G	2	1.83	5.5	4.5
H	2	2	6	unfinished

In the pretest, subjects spent about 2 minutes to fold the cube. In the given 5 minutes, none of them had finished folding the complex net called "cubeoctohedron". Subject E finished just after 5 minutes. Subject H didn't know how to start folding it. He folded and unfolded the piece of paper for more than 2 minutes. Since the test was a group activity, subject H was eventually able to complete the construction by observing other students' responses.

In the posttest, the cube net was used again. However a different and more complex net called "Posttest Complex Net" replaced the cubeoctohedron . The subjects had never seen the Posttest Complex Net during sessions. Before folding the nets, subjects were asked to predict and draw the shape of its solid. All subjects drew the cube quite accurately, however, when they drew the Posttest Complex Net, their drawings were varied and represented three different levels of visualization (Figure 4).

Figure 4
Students' drawings



Even though they are not accurate, Subject E and H's drawing have squares and hexagons, and the connections are linear. Subject H drawing has squares and rather linear compared with Subject F. Subject F's drawing was global and nonlinear. When considering their response, "no idea", in the pretest, these drawings indicate that they could imagine some shapes from the net.

The amount of time to fold the cube on the posttest was slightly reduced from that on the pretest. However, folding the Posttest Complex Net took much less time than folding cubeoctohedron on the pretest for three students. Subject F finished in about 4 minutes, and subject E and G finished in about 5 minutes. Subject H couldn't finish in the given 5 minutes. He said, "I couldn't fold this, this is too complicated."

Since the pre and post test measure for this exploration was timed, subjects' performance was examined for evidence of spatial visual thinking as well as the manual dexterity required to fold the nets. By drawing a prediction of the resulting shape, students were revealing their initial representation of the projected 3-D object. The differences in manual dexterity among subjects and also the differences between pre and posttest of each subject could be measured by the amount of time for folding the cube. The fact that subjects all spent about 2 minutes for folding the cube indicate that there was little variability in manual dexterity among the subjects. Also the amount of time for folding the cube didn't change much from the pretest to the posttest. The small differences might be caused by folding same net twice. Therefore, it is not evident that students' manual dexterity effected the results or changed substantially after students had used HyperGami for 6 hours.

However, there were noticeable time differences for folding the complex nets among subjects, and between the pre and posttest. Three subjects spent less time for folding the complex net on the posttest. When considering that the Posttest Complex Net was more complex than any with which they had worked, we suggest that the time difference between the pre and posttest is even more meaningful. These preliminary results suggest that HyperGami is a rich environment for developing spatial visual thinking skills.

Exploration 3

Four sixth grade students, three boys and one girl, participated in this exploration. Subjects were asked to count the vertices and faces and to identify the shape of the faces after truncation of vertices in the pre and posttest.

Students were given approximately five minutes to examine tetrahedrons, cubes, and octahedrons. The investigator identified the vertices on each of the polyhedra. The types of faces on each of the polyhedra were also noted by the investigator. Instruction was given on how truncation was done; each vertex would be shaved off to an equal depth. After examination by each student, the polyhedra were removed and the test was given.

The results of the pre and posttest are summarized in Figure 5. The results show no evidence of improvement between pre and posttest. The students in this exploration did not seem to have the knowledge and experiential background necessary for abstract reasoning problems dealing with truncation. It would be beneficial to investigate these activities with subjects at the high school or college level.

Figure 5
Pre and Posttest Results

	Vertices and Faces Counted		Faces Formed by Truncation	
subj.	Pre	Post	Pre	Post
I	6	6	5	5
J	3	3	0	0
K	5	4	3	1
L	5	5	2	6

Discussion

Each of our explorations examined users interactions with a potential rich environment for developing spatial visual thinking skills. In the first exploration each subject made gains in their ability to recognize the nets of solids. This requires spatial visualization ability. However, the ability to recognize more of the complicated nets should have increased if they were given more time in which to explore with the HyperGami.

Students in the second exploration reduced time for folding the complex net. The result suggests that interaction with HyperGami may have helped the subjects improve their ability to visualize the solid from its two dimensional net. Subjects reported that "HyperGami helped their imagination ..." to look at three dimensional polyhedra from two dimensional nets and vice versa. No evidence was found that manual dexterity was a confounding variable.

The subjects' drawings support the findings of Potari and Spiliotpoulou (1992). They found that the degree of sophistication in visualizing the nets grew with respect to the age of the children. Younger children had a more global and holistic view of the solids' nets and older children viewed the nets in a quantitative and analytic manner. Subject F was the youngest among the four subjects. Subject F's drawings are the most global and holistic. Even though Subject H, the oldest, could not finish folding, his drawing shows that he identified a hexagon and squares in his imagined solid.

Counting vertices and counting faces without seeing the object requires spatial visual thinking. However, we found no evidence in our third exploration to show that the six hours spent interacting with HyperGami helped the sixth graders to count vertices, to count faces or to identify faces after truncation of vertices. Further study in this area is needed. Also, the use of older subjects may be considered.

More work needs to be done using HyperGami[1] and perhaps other software similar to HyperGami before any generalizations can be made. In our investigation, we were only able to work for one hour a week during a period of six weeks and we were limited to four children in each group. Studies need to be done with larger groups of children and in a situation in which the children have more time to work within the microenvironment.

The results of this exploratory study were promising. Further study aimed at identifying the cognitive processes involved as students interact with this media is warranted.

[1] At the time we conducted our investigation, Fall 1995, HyperGami was still in development. The beta version requires a Macintosh with at least 10 megabytes of RAM. As a result if one was using a machine without much more than 10M of memory, many of the processes, including truncation, in the program were extremely slow.

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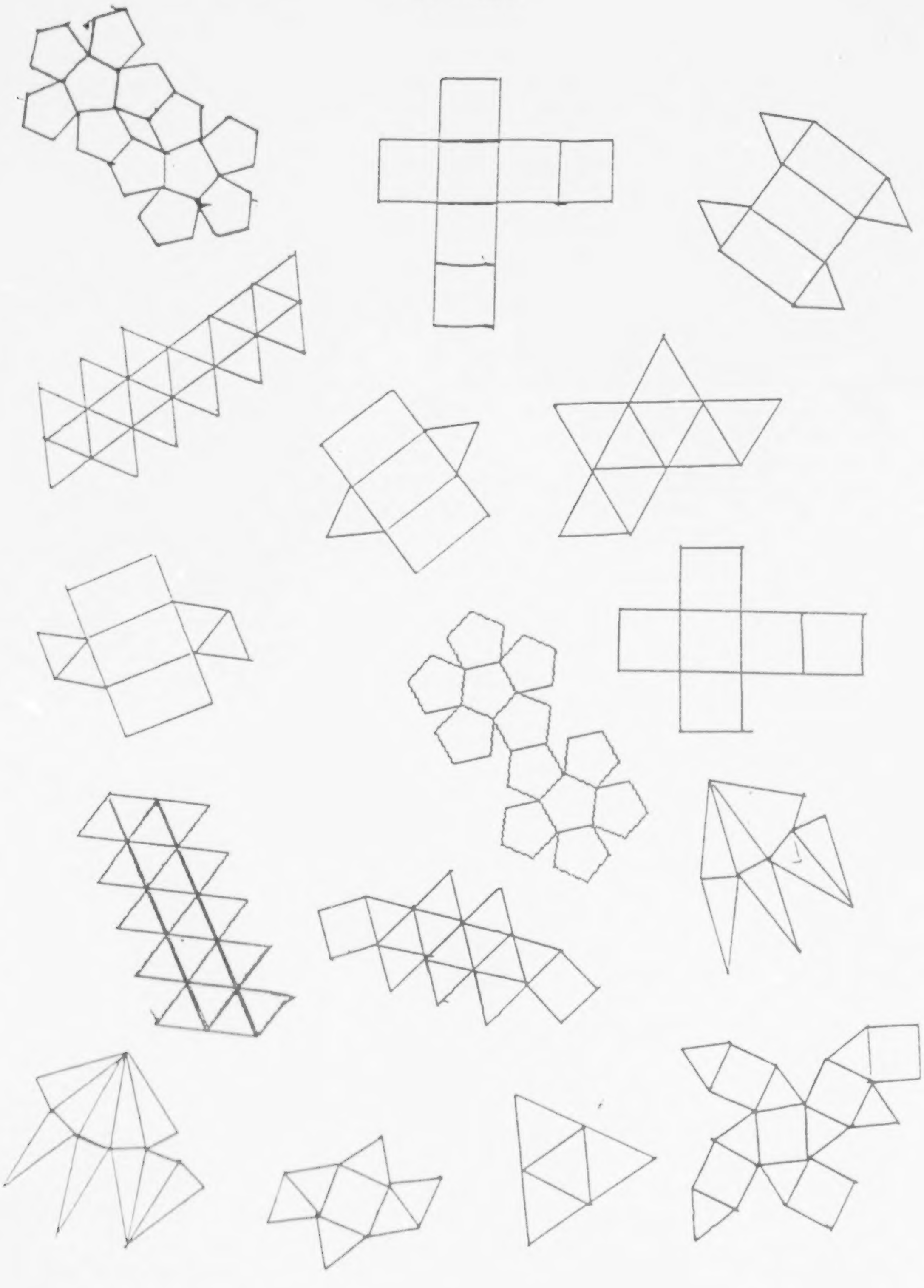
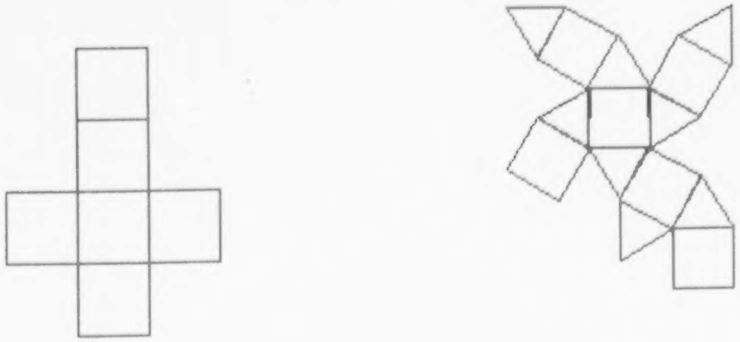
Appendix A



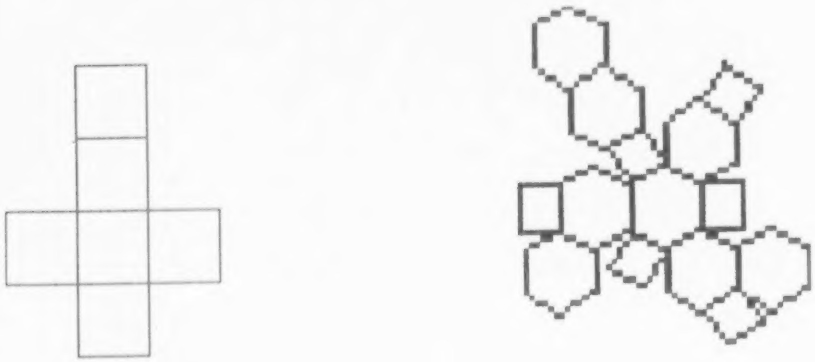
265

Appendix B

Nets given in the pretest



Nets given in the posttest



Creating Critical Thinkers

by Marilyn Bazeli and Rhonda Robinson

Abstract

The importance of critical thinking skills will only increase in the near future. Students need to have activities which encourage critical viewing and thinking in order to motivate their interest in learning thinking skills. This article suggests ideas for the inclusion of critical thinking across the curriculum.

Introduction

Many of the educators involved in teaching the concepts, activities, and tools of visual literacy have faced the challenges of others who are not convinced of the value of the ideas. We have been often relegated to adding visual literacy to art, media, or language arts without being able to integrate the ideas of visual literacy across the curriculum. One way that the integration of visual literacy can be encouraged is through the importance of critical thinking and problem solving. We believe that many different activities which promote visual literacy can be accomplished by incorporating them within materials and activities across the curriculum which develop critical thinking.

Since students must be prepared to face the challenges of our global society, and the increasing demands placed upon them to solve serious problems in our culture, critical thinking skills are being proposed as an important part of the curriculum. "In a democracy, children need to be educated in ways that will assist them in creating the future, and not merely to exist in it" (Goodman, 1995, p. 5). Students must learn to be good communicators and to use higher order thinking skills to find solutions to ever more difficult problems.

The issues of our culture are presented visually each day in the media. Students must learn to critically consume these images in order to become better communicators. Visuals can inform or inflame. "It's important to raise children who are inquisitive and who make good judgments about the mass media's influence on them...to become sophisticated consumers..." (Mann, 1994, p. 2). Students who develop critical viewing and thinking skills are more prepared to solve the problems which face them. Critical thinking skills help students weigh the value of ideas, and to consider solutions and possibilities rather than merely accept information at face value.

Since so much of their world is a visual one, students should be encouraged to learn to receive, consider, critically analyze, and evaluate the information they receive through visuals. Critical thinking and viewing skills are necessary to help students understand what they see, since otherwise students may have a willingness to accept visual representations as accurate reflections of reality (Considine and Haley, 1992). Using visuals for the promotion of creative and analytic thinking has been promoted by Goldstone (1989). Her work supports the idea that visual analysis and critical thinking are an important part of the curriculum. And in our earlier work, Bazeli found that students are motivated and excited by studying visuals and critical thinking (1991). Her work showed that students are more positive and confident about critical thinking problems when they have experience with critical viewing activities and skills.

The following suggested activities are merely a beginning. Most educators should be able to use these ideas to create their own lessons and curricular changes. The inclusion of critical thinking and viewing skills across the curriculum is one way to approach the development of problem solving, which could help promote the type of students prepared to accept the challenges they face.

Video Analysis

Using a variety of video analysis activities within the curriculum can help develop perception, interpretation, and discrimination skills. Lacy (1988), Limberg (1988) and Payne (1993) have all described ways that the use of television programs can help develop critical viewing and thinking. Guiding students to view and discuss the differences between fact and fiction, the effect of the violence they view, and the value of the news coverage they watch can help them become more critical thinkers. Television today makes the difference between information, edutainment, and entertainment more difficult to discern. Students need guided practice to discover the "reality" behind televised messages.

Language Arts

Use clips of popular television programs to discuss the literary elements of narrative fiction. Introduce the traits of character, setting, plot, and resolution by discussing them through a variety of televised fictions, whether they are hour long dramas or half-hour situation comedies. Character can be introduced by looking at the programs without the sound, and discussing the elements of stereotyping evident within costumes, hair styles, and physical actions. More detail of character can be discussed by watching a segment of the drama and asking about the motivations, decision-making abilities, and ramifications of actions of characters.

Asking students to discuss the actions taken by characters, and predict their consequences, can help them determine the "reality" of fiction and its relationship to their lives. Seeing the development of the plot elements, and trying to predict how the plot will resolve itself, helps students analyze the development. Students could then be asked to describe the personality or characteristics of their favorite characters, filling the blanks in their character development. They could then be taught about scripting, and could he asked to develop activities and plot lines for their characters which would be fitting for the aspects of the character that they have recognized. Others could be assigned to read and critique the plots, asking whether or not the characters, as they understand them, would act in the way the students have written.

Analyzing the setting of programs helps students understand the importance of setting in fiction. Looking at how the rooms are created, the space is utilized, and the motion carried forward all help students understand the impact of setting. Students could be asked to describe and even draw the setting for a new program involving their favorite characters, or place their characters in an unusual setting and describe it fully. Watching how setting moves the action forward can help students understand that plot is involved with where, not just what happens.

Social Studies

Critical viewing activities can help students discriminate between fact and fantasy. For instance, viewing videotapes of news events which have also been fictionalized in films or on television can spark discussion of the difference between reality and narrative creation. One example would be to show clips of an Apollo moon landing or other space footage and then show similar events as depicted in *Apollo 13*. Many news events are later depicted in made for television movies, such as the "The Burning Bed" type movie depicting violence in our culture. Other films have been made from true stories, such as teacher Louanne Johnson's *Dangerous Minds*, and then even later made into television programs or series. The comparison of fact, novelization, film and television programs can help students hone their critical skills in determining where truth and fiction differentiate. The students can also discuss the visualization of characters and events, and analyze how the visuals create the written story details and nuances.

Analyzing history can be effective when looking at the visuals available, for instance, on the World Wide Web from the National Library of Congress. Seeing the diaries, the original Depression photographs, and the many other visuals available bring history into the present in a way that helps students really consider the difference between fact and fiction. Studying an era through its written history, its pictures, and its fictional depiction on films (such as the settling of the American West) can bring history and culture to life. Asking students to think about, discuss, and write details of differences noted in the books, articles, and then in documentaries such as The West or fictional versions such as Dancing With Wolves, can help them begin to critically look at the idea of living history.

Reading

Many films and television programs have been based upon novels, plays, short stories, and even poetry. For years students have been comparing the differences between characterization, settings, plots, and resolutions to stories as presented in the different media of our culture. Asking students to write new endings, compare fiction and film, and analyze the strengths and weaknesses of each version can help them understand each better. Often, students can write reviews of a novel prior to seeing the film, then see the reviews of the film as written or broadcast by today's film critics. Comparison between students' analyses and the professionals can help sharpen their critical skills.

Video Production

Following are some ideas for incorporating television production into various curricular areas (Bazeli & Heintz, 1997). As students plan their television production, they apply critical thinking skills to reach decisions, such as what to include visually and auditorially in their production, and the types of camera angles and shots.

Math

A student prepares an instructional lesson, dealing with a particular math process that he/she has mastered. The lesson is then videotaped. Two critical thinking activities are involved: 1) the student preparing the lesson develops an even deeper understanding of the process during the preparation of the lesson, and, 2) other students can use the videotape to help them learn the process. When a peer explains a math process it can sometimes be understood better than when the teacher is doing all of the explaining. Further, the videotape can be played many times, giving additional instruction to the students.

Science

The teacher sets up all necessary equipment for an experiment. Someone videotapes the teacher conducting the experiment with no verbal explanation. The videotape can then be used as a motivator to begin class, and, more importantly, to develop students' critical thinking regarding what they saw, why it happened, or what conditions caused it to happen. For example, a simple experiment involving the concept of air pressure, the familiar "crushing of a can" experiment, can be videotaped. As students view the videotape of the can magically collapsing before their eyes, with no visible force acting upon it, an animated discussion occurs as to why that was happening, what caused it to happen, and so on. The actual experiment can be repeated later, in real-life, to further solidify the concept of air pressure in the students' minds.

Reading

After reading a book with a well defined character, the student prepares an oral report from the viewpoint of the character. The student dresses as the character, talks and acts as they believe the character would, uses any props necessary to visually represent the character, and discusses the story elements as the person involved in the story. The report is videotaped, and can be used as a resource in the library to help students select interesting books. It provides an excellent way to motivate students to read, and to think critically about what they are reading.

Social Studies

As an addition to letter-writing with pen pals, students can be "video pen pals". (This is especially educational when the pen pals are in another part of the country, or even in another country completely.) Students prepare messages to videotape and send to their pen pals. Critical thinking skills are employed as students analyze the types of visuals they want to include in their videotape. For example, selected views of the school, the community, the landscape of the area, weather conditions, and so on, would give precise visual messages to the pen pals in a different location. Students should be encouraged to think carefully about what they want to show and why they think it would important to show those chosen visuals. Preparing their verbal explanation of the selected views, as recorded on the videotape, would further encourage their research and thinking skills.

Hands-On Activities

Following are some activities that have been designed specifically for the purpose of developing critical thinking and spatial visualization through hands-on, visual experiences. Many of the activities described here involve geometry and/or reasoning skills, and have been shown in studies to be effective in developing not only math concepts, but also higher-order thinking skills. Other activities deal with pattern, attributes, and sequencing of visuals, skills that are necessary across the curriculum.

Tangrams

Tangrams date back to the time of Pythagoras (500, BC), and have long been used in math classes. One tangrams set is made up of seven geometric pieces (one square, two large triangles, one medium triangle, two small triangles, and a parallelogram), and those pieces are used to create hundreds of geometric shapes. As students create shapes, understandings such as relationships of shapes to each other, transforming shapes (squares into rectangles or rectangles into parallograms, for example), and rotating shapes are developed.

Pentominoes

The first known pentomino puzzle was published in 1906, and in 1953, Solomon W. Golomb at Harvard rediscovered the puzzles and coined the name "pentominoes". Pentominoes are geometric shapes formed by five squares joined together in different configurations. There are twelve shapes in one pentomino set. Students solve puzzles by using the pentominoes to completely cover a designated shape. (The designated shape must be covered, with no part of the pentomino pieces extending outside of the line of the shape.) In solving the puzzles, students develop concepts of measurement, number, and geometry, plus problem-solving, strategic thinking, and a sense of two-dimensional space. Students from pre-school through adulthood can use pentominoes at the appropriate difficulty level.

D.I.M.E. Build-ups (Development of Ideas in Mathematics Education)

In this activity, students construct three-dimensional objects from two-dimensional drawings. Using foam plastic shapes, students look at drawings in the accompanying book (from easy to difficult) and attempt to build the real-life equivalent shape. Visual perspective, rotation, and perception, as well as geometry, problem-solving, and a sense of three-dimensional space are developed.

Visual Thinking Task Cards

These task cards were created and published by Dale Seymour Publications. They provide problems in patterns, symmetry, congruence, perception and illusion, all leading to increased critical thinking skills. Students can attempt to solve the problems presented on the visual task cards individually, or with a partner or group.

Resources: (for all materials above)
Dale Seymour Publications
P.O. Box 10888
Palo Alto, CA 94303-0879
(800)827-1100 Fax(415)324-3424

Computers

Computer software and CD-ROMs frequently focus on using visuals to develop critical thinking skills. As students are required to manipulate, rotate, and interact with visuals on the computer screen, they are applying problem-solving and thinking skills.

LOGO Programming Language

When Seymour Papert designed the LOGO language, his purpose was to provide even young students with a way to develop a logical, step-by-step approach to problem-solving. LOGO is very visual, incorporating geometry concepts as the "turtle" is moved about the screen creating endless numbers of shapes in various colors. Drawings from simple squares to detailed, full-color artistry can be created, depending upon the expertise of the user. The thinking process is developed as the student first builds a simple figure, adds other figures to make a procedure, and then combines procedures to form complicated designs.

Computer Software

Programs such as HyperStudio and Authorware provide students with tools to help them analyze information, organize information visually, and create a presentation demonstrating their learning. Many other software programs focus directly on such skills as sequencing, spatial visualization, mirror imaging, perception, and visual problem-solving.

Computer Drawing Programs

Various drawing programs, for different levels of expertise, are available for computers. Many programs include a graphics library that can be used to aid in the completion of pictures. One activity (Bazeli & Heintz, 1997) that utilizes the drawing capabilities of computers is to have students create a picture on the computer, during which they think about elements of a story to accompany their picture. The completed picture is printed, preferably with a color printer. (If a color printer is not available, students can color their black-and-white print out.) Each student then writes his/her own story to accompany the picture that was created, and the completed pictures and stories are displayed for all to enjoy.

Visual Analysis

Visual analysis and perception are normally taught to children at very young ages, with toys designed to help teach such skills as determination of color, basic geometric shape discrimination, and shapes of letters of the slphabet. In early school years, instruction focuses on visual discrimination of letters and numbers as children begin to learn to read and perform math computations. However, that instruction and practice with visual analysis and perception tends to slow down or even stop as students reach the ages of seven or eight. Because of the visual nature of communication in our world, visual analysis and perception should continue to be taught and developed at all ages. Following are some activities that can help to develop those skills.

Animalia, by Graeme Base

This book contains wonderful, colorful, and very detailed drawings focusing on each letter of the alphabet. Each page depicts many objects whose name begins with the designated letter. Vocabulary development is enhanced by using this book, as well as visual discrimination and perception, and it can be used at all age levels. A teacher can use one page on a transparency, and ask the students to list as many objects as they can. Students can work individually or in groups. Posters of the pages in the book are also available, which can be posted around the room, again affording groups of students the opportunity to view a page at the same time. After experiencing the analysis of Base's drawings, students can be encouraged to create their own alphabet pages, with their own hidden drawings of objects. This activity causes students to run to the encyclopedia, dictionary, and other resource materials to locate more objects beginning with the designated letter.

The Art of Bev Doolittle

Bev Doolittle has become known for her "camouflage" art. Embedded in her beautiful water-color paintings of wildlife scenes are faces or images of Native Americans, animals, or other pictures that contribute great meaning to the painting. As students carefully analyze her paintings, wonderful discussions can occur centering around conservation issues, environment and habitat, and historical/cultural interactions with nature. Not only do students become better critical viewers, but

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they also develop some affective attitudes regarding our environment on earth.

Resources:

Animalia
by Graeme Base
Harry N. Abrams, Inc., Publisher
New York

The Art of Bev Doolittle
Text and Poems by Elise Maclay. Edited by Betty Ballantine
The Greenwich Workshop, Inc.
30 Lindeman Drive
Trumbull, CT 06611

Photography

Photographs can be a very exciting resource for critical viewing activities. Students can produce their own or find examples from current magazines such as *National Geographic* or even *Rolling Stone*. Students can bring in favorite family photographs to discuss their meaning and share it with others, or they can discover the visual elements such as shape, color, pattern, texture, and so on, in photographs they have found in print. Of course, many photographs are available on the World Wide Web as well, and can be saved for analysis and sharing, printed, or used in student productions and reports. Students can analyze historical and current events, uncover biography information, and learn the critical aspects of science or geography topics using the WWW or encyclopedic CD-ROM materials as sources of excellent photography. Even posters, music or sports pictures, and advertisements can be sources of photographs for analysis, and can lead to discussions of the manipulative techniques used for advertising or the creation of reality from non-reality using computer-manipulated images as photographs. Students can focus on photographic images as an activity to encourage writing, develop autobiographies, or detail events and facts for reports.

Conclusion

The many activities briefly discussed in this article should give educators some ideas for starting to use viewing skills activities to foster critical thinking and problem solving. They should find that these activities are motivating, exciting, active, and engaging. They help make critical thinking activities relevant, meaningful, and integrated into the usual curriculum. In addition, using popular media as a source for visual thinking and critical viewing skills activities help create a positive attitude towards critical thinking and classroom analysis activities. Using the media of our culture links critical thinking to life in a way that keeps critical thinking from being isolated or seeming too difficult for students. And of course, using viewing activities is not only motivating, but it is challenging, fun, and can enhance communication skills among students while they develop their critical thinking skills as well.

Students benefit from sharing ideas, from discussing differences in perceptions or opinions, and from working together in these activities to develop their critical thinking skills. They gain valuable and valued information, and may even change their attitudes about learning, when challenged to develop their own critical perception and analysis abilities as part of their regular school day. Helping students discover their own thinking skills and relate them to communication and visual skills will help them prepare for the world they face as we enter the new century.

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Perception In The Invisible World Of Physics

by Lisa Novemsky and Ronald Gautreau

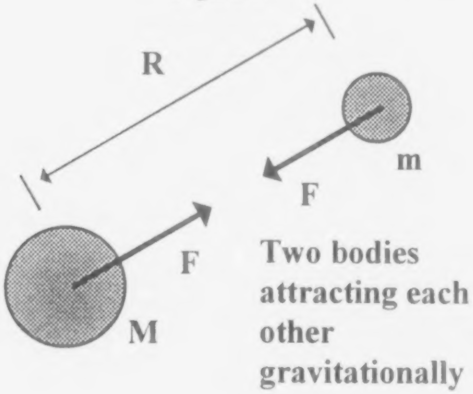
Abstract

We combine the knowledge and experience of a physicist, a relativist, who is a seasoned introductory physics professor, with the insight of a social psychologist and science education researcher, bringing the world of the psychology of perception to the task of exploring the world of physics imagery.

Visual Literacy for Basic Physics

At this very moment do you find yourself sitting down, sitting up, standing, lying, or floating around the room like an astronaut? Can you "see" the forces involved in shaping your position? Sir Isaac Newton pondered this question and was able to "see" the attractive force between bodies such as a falling apple and the earth. In 1696, he set forth his Law of Universal Gravitational Attraction that every body in the universe attracts every other body (Figure 1).

Figure 1



He went on to describe this relationship in a formal mathematical statement:

$$F = G\frac{Mm}{R^2}$$

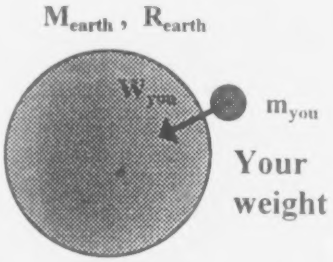
Here M and m are the masses of the two attracting bodies, R is the center-to-center distance between the bodies, and G is just a number that has the value $G = 6.67 \times 10^{-11}$ N-m^2/kg^2.

Think about the nature of communication of this formal physics equation. How does it differ from your internal image and the visual representation above? What is lost and what is gained in each of the three representations--the picture you formed in your mind's eye, the force picture above, and the mathematical equation?

Can you see that big earth below you with a very large mass M_{earth} pulling your little mass m_{you} toward its center a distance R_{earth} away from its center, as shown in Figure 2? This force, equal to your weight W_{you}, can be expressed in Newton's equation written to express your sitting on the earth's surface:

$$W_{you} = G\frac{M_{earth} m_{you}}{R^2_{earth}}$$

Figure 2



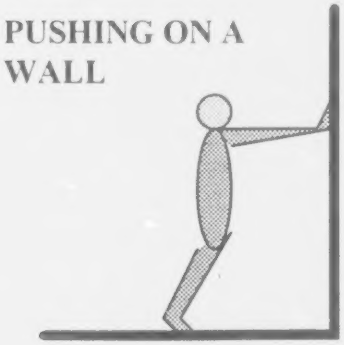
Can you picture the weight force on you? Force, one of the most basic concepts, inhabits the *invisible* world of physics.

Right now you are pulling on every thing else in the universe--the paper or book you may be reading, the earth below you, the moon above you, the farthest galaxy, the feathers of every bird. You are like an octopus possessing invisible tentacles that reach out and pull on every other object in the universe. To paraphrase an observation about gravity made by the eminent Nobel Laureate P.A.M. Dirac--a tiny flower fluttering in the wind shakes a star in a distant galaxy.

The Ubiquitous Force Vector

The gravitational force is a special force. It acts between objects that are separated from each other. The technical name is an "action-at-a-distance force." Other more "ordinary" forces occur, according to Newton, because one object touches another object. These are known as "contact forces." Push on a wall (Figure 3). Before you touch the wall, there is no force. According to Newton, only when you make contact with the wall does a force exists. Once you touch the wall, there is a force on it. In turn, there is also a force on your hand. You can feel it.

Figure 3

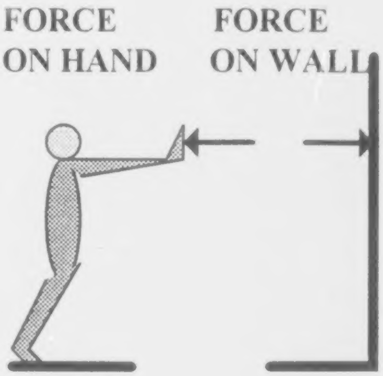


Before reading further, try to visualize the forces. What is it that you see in your mind's eye?

Now, let's look at how physicists describe the forces that arise as you push on the wall.

The contact force on the wall by you and the contact "back force" on your hand by the wall is an example of an action-reaction pair of forces. Newton tells us that forces always come in pairs--"action-reaction pairs." You will never find an isolated force. Moreover, at any given instant the strength of each force in the pair is the same (Figure 4).

Figure 4



In short, for every action there is an equal and opposite reaction. This is Newton's Third Law. Push on the wall with a force of five pounds, and the wall pushes back on your hand with a force of five pounds. Push harder with a force of ten pounds, and the wall pushes back on your hand with a force of ten pounds. No matter how hard or soft you push on the wall, the wall responds by pushing back on your hand with exactly the same force. If you don't push on the wall--if you are not touching the wall--then the wall is also not pushing on your hand, and you and the wall experience no force.

What do you actually *see* as you are pushing on the wall? Do you see your hand touching the wall, or the wall touching your hand? You don't see any arrows pointing one way or the other, as in Figure 4. You feel a force pushing harder and harder on your hand as you push harder and harder on the wall. These action-reaction forces are *felt* by you or the wall. But the forces are not *seen*.

Perceptual Aspects of Understanding Physics

The eyes of the physicist are tuned to the invisible. According to the physicist, everyday real world forces are seen as invisible pushes, pulls, tugs, heaves, squeezes, stretches, twists, and presses (Hart-Davis, 1989). The introductory physics student struggles to "see" these filters of conventional physics ideas that most physicists don't think twice about.

This paper draws on several theories of perception and imagery to explore experiences with the invisible world of physics. A basic process involved in the act of physics learning is a change in habitual perception of the everyday world. In order to describe the real world scientifically, an individual's perception and cognition must be capable of reconstructing the world from the raw sensory data perceived, incorporating the acquired knowledge of the scientific community. Understanding physics concepts involves the instantiation of a scientific mode of perceiving, categorizing, analyzing, and explaining the world. The development of an altered processing system for most of us involves a deep learning that encompasses multi-modal, socio-emotional, and language aspects. In order for an individual to be recognized as a physicist, that person is required to be somewhat fluent in scientific perception, analysis, and explanation.

Generation of Images as a Route to Understanding Physics

Albert Einstein is quoted as having said about his ability to conceptualize: "If I can't picture it, I can't understand it." Generating external images of physics phenomena by drawing, sketching, or diagram making can help the novice to create, refine, manipulate, and reason from internal visualizations. Dissonance created when comparing dissimilar representations provides the natural context for developing scientific understanding. Abstract representations and notations, such as the ubiquitous vector, play major roles in physics literacy. Graphic representations provide two dimensional concrete models for discussion and debate. Sketching may prove invaluable in self-generated explanations.

Internal Physics Imagery and Physics Thinking

Internal imagery seems to play a role in learning and memory that philosophers, psychologists, cognitive scientists, neuroscientists, and educationists have explored for centuries. Internal pictures, images, icons, diagrams, mental models, internal representations, and schema are among the constructs that exemplify theorists' efforts to describe the internal mode of representing, storing, imaging, and thinking about the external world.

"One of the remarkable attributes of human intelligence is the ability to convert a problem into a familiar form or *representation* that can be operated on using previously known techniques. .(and) intelligence is largely the ability to create and manipulate descriptions" (Fischler & Firschein, 1987, p. 63). Howard Gardner defines spatial intelligence as the ability to form a mental model of a spatial world and to be able to maneuver and operate using that model (Gardner, 1987). Recent educational research indicates that this kind of intelligence is a skill that can be learned. Formerly it was believed that spatial ability was a facet of intelligence that was a stable measure for an individual.

Imagery can be "conceptualized metaphorically as a work space in which cognitive processes can operate" (Paivio, 1990, p. 74). This is particularly relevant to the process of problem solving, so prevalent in science, particularly in math and physics.

The famous examples in science of visual thinkers include the German chemist August Kekulé, who conceptualized the benzene ring. This crucial discovery was induced by a dream of a snake holding its tail in its mouth (Krippner, 1969). Richard Feynman is said to have been a visual thinker who drew "strange" diagrams on the blackboard which, with a minimum of equations, communicated his version of the universe (Dyson, 1979). Albert Einstein once wrote " The psychical entities which seem to serve as elements in thought are certain signs and more or less clear images which can be *voluntarily* produced and combined" (Ghiselin, 1952, p. 43).

What is light? Two Mutually Incommensurate Images

What could be more visible than 'light itself? The physics community has agreed to see light in two mutually incommensurate images. Light can be viewed as a wave or a particle. Scientific labeling justifies this indecisive set of "right" answers as the *wave-particle duality.* Within the world of physics the dichotomous metaphor of a single phenomenon is preserved. Sometimes physicists require light to be viewed as a wave, and at other times as a particle.

Light-- a Wave?

Light bends around objects, and interferes with itself producing intense and zero lines when it goes through a diffraction grating. The colors of the rainbow that result when light goes through a prism are understandable from the wave idea that light of different frequencies bends by different amounts as it moves through a dispersive medium. Experiments such as these gave rise to a wave picture of light.

As the wave picture of light developed, an important question arose. If light is a wave, what is it that is waving? The answer was provided in sorts by invoking the theory of electricity and magnetism that was developing in the 1800's, finally culminating around 1860 in the equations that Maxwell synthesized from work of many predecessors such as Coulomb, Gauss, Biot-Savart, Ampère, and Lenz.

The ultimate equations of electromagnetic theory realized by Maxwell are built upon the notion of a quantity called a *field*, an *electric field* **E** and a *magnetic field* **B**. These electromagnetic field quantities **E** and **B** are similar in sorts to the gravitational field force described above. It developed that the wave idea of light could be explained if light were supposed to consist of vibrations of electromagnetic fields. The feature that distinguishes light vibrations from other electromagnetic fields such as radio or TV waves is simply one of frequency--the number of vibrations per second of the field quantity.

As the theory of light as a vibration of an electromagnetic field began to take hold in the late 1800's, the relationship of the notion of the behavior of light as governed by Maxwell's equations given here could be summarized as:

And God said:

$$\oint \mathbf{E} \bullet d\mathbf{A} = q/\varepsilon_o$$

$$\oint \mathbf{B} \bullet d\mathbf{A} = 0$$

$$\oint \mathbf{E} \bullet d\mathbf{l} = -\frac{d\Phi_B}{dt}$$

$$\oint \mathbf{B} \bullet d\mathbf{l} = \mu_o \varepsilon_o \frac{d\Phi_E}{dt} + \mu_o i$$

AND THERE WAS LIGHT!!!

Light--A Particle?

The search for an understanding of the nature of light did not end here. In 1905, Einstein put forth two new views about light.

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In explaining the photoelectric effect, Einstein showed that in certain instances light could not be a wave. Instead, light is composed of massless particles called photons. Photons, with zero mass, move at the speed of light. Further, each photon carries a bundle of energy E of the amount

$$E = h \times \text{(the photon's frequency)}$$

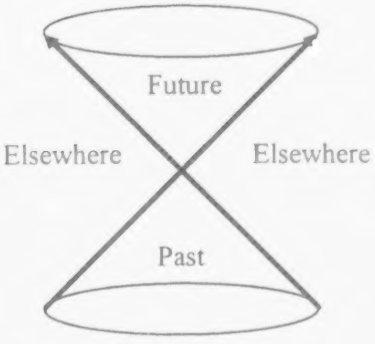
where h is a constant, called Planck's constant, whose numerical value is $h = 6.63 \times 10^{-34}$ J-s.

Light--The Ultimate Speed

Keeping the wave idea of light from Maxwell's equations, Einstein in 1905 showed in an entirely different paper putting forth his theory of special relativity that the speed of light was the *ultimate* speed. No particle with mass could be accelerated up to the speed of light.

The theory of special relativity led to the notion of an intertwined spacetime of the previously separated Newtonian picture of a separate space and a separate time. This brought into the mind's eye a new picture of light--the *light cone* (Figure 5).

Figure 5



At a given time at a given spatial location--at a given event--imagine that a flashbulb emits a flash of light. The equation of the light signal is

$$\text{distance} = ct,$$

where c is the speed of light, $c = 3 \times 10^{8}$ meters per second = 186,000 miles per second. That's really fast! On a plot of x and y versus t, with ct plotted vertically and x and y plotted horizontally, the resulting picture looks like a cone, as shown in Figure 5.

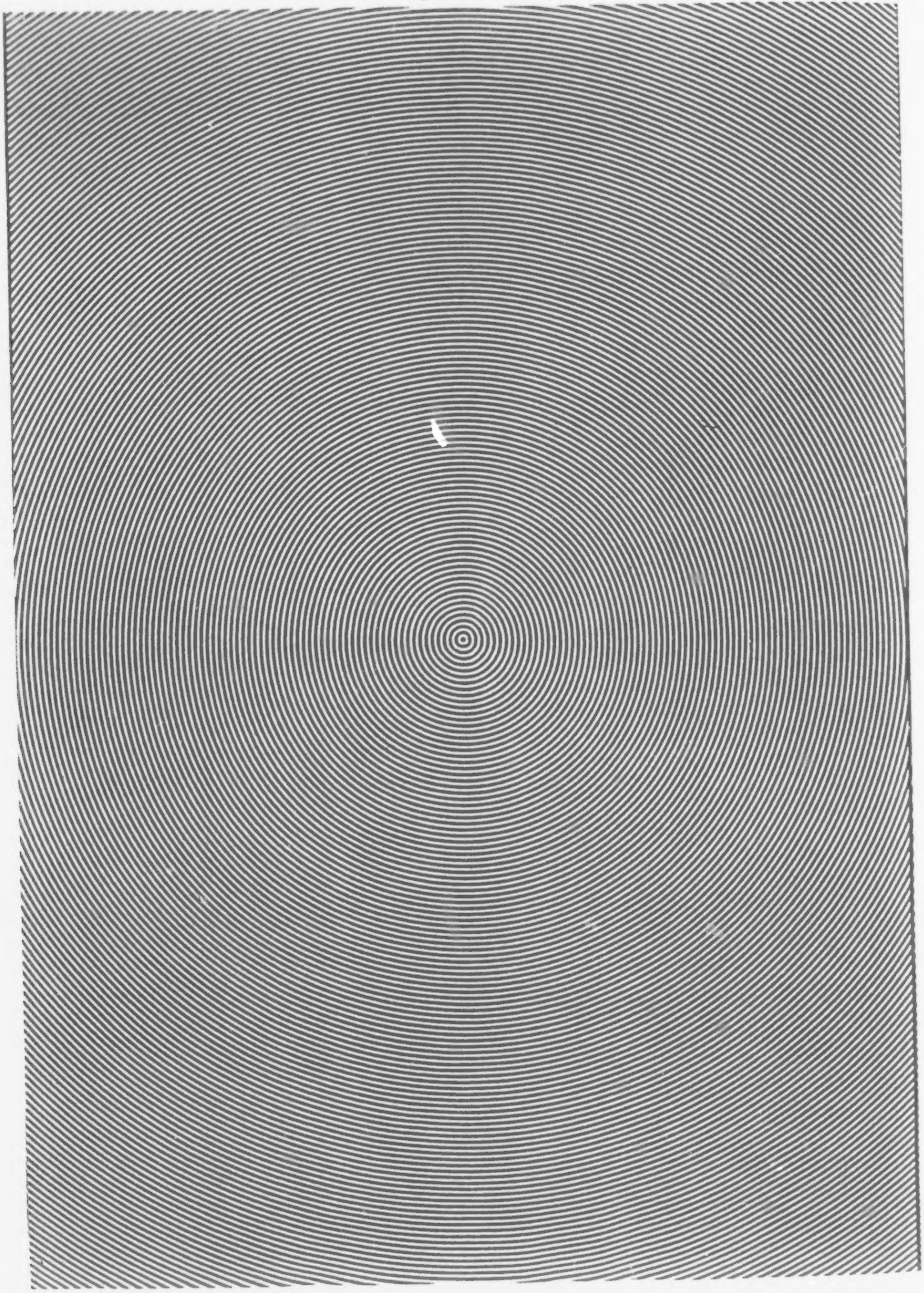
Making Sound Visible

Another wave phenomenon is sound. Sound travels in air via condensations and rarefactions of air molecules. But, have you ever seen an air molecule? It is possible to make this invisible vibration take on an apparent visible form.

Sound vibrations can be modeled with a common Slinky. The undulations of the coils of the Slinky provide a dynamic model of air molecules vibrating back and forth about their equilibrium position.

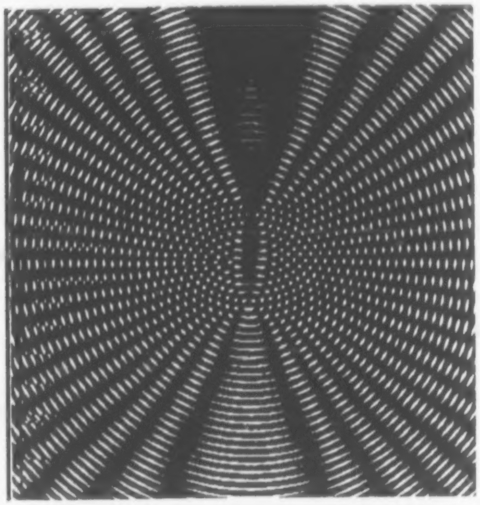
One can also model a periodically vibrating sound wave emitted from a point source with concentric circles, as shown in Figure 6, representing outward moving circular condensations and rarefactions of air molecules. If you make up two identical overhead transparencies from Figure 6, and place one on top of the other with the centers slightly offset from each other, you can see, and if you wish project through an overhead projector, a model of the interference lines that result from two sound sources of the same frequency, as shown in Figure 7. Further, if you make up two overhead transparencies that are slightly different in size, and plaçe one on top of the other with the centers coinciding, you can project on a screen a model of the beats that result from two sound sources that differ slightly in frequency (and wavelength).

Figure 6



With a little practice, you can use various types of transparencies made from Figure 6 to experiment with visual versions of the invisible molecular motion as described by sound theory.

Figure 7



INTERFERENCE PATTERN FROM TWO SOUND SOURCES

Black Holes-The Ultimate Invisible

General relativity, developed by Einstein around 1915, is a theory of gravity that supersedes Newton's ideas and has important consequences for objects that are very massive. One of the notions that has emerged from the theory of general relativity is the possible existence of what has become popularly known as a *black hole*. Black holes are said to form when a star somewhat more massive than our Sun runs out of nuclear fuel and starts to collapse in on itself. If the process occurs in a proper spherical manner, the mass of the star doesn't change. Picture the radius of a spherical ball getting smaller and smaller while the mass stays fixed at the value it had when the collapse started (Figure 8).

Figure 8

GRAVITATIONAL COLLAPSE
Radius R decreases

Mass M stays constant

The collapse might stop, forming a very dense object such as a neutron star. On the other hand, some physicists believe that in some situations the process will not stop, but will continue indefinitely with the radius of the body approaching zero while its mass remains fixed. This means that the object's density--its mass divided by its spherical volume--gets larger and larger, approaching an infinite value as the volume shrinks to zero with the mass remaining fixed. Before the radius shrinks to zero, when an infinite density occurs, the radius will shrink through a critical value called the *Schwarzschild radius* R_S given by

$$R_S = \frac{2GM}{c^2}$$

Here M is the mass of the collapsing star. To get a feeling for how small this radius is for typical stars, the Schwarzschild radius for our Sun, whose mass is 2×10^{30} kg, is around 3 kilometers, around 2 miles, which is much much smaller than its normal radius of 7×10^5 kilometers.

The Schwarzschild radius is often referred to as the radius of a black hole. According to many present beliefs, once a star has collapsed to a radius smaller than its Schwarzschild radius, which is determined by its mass, it afterwards can never stop moving inward and must inevitably shrink to zero radius resulting in an infinitely dense object. As described in one widely-read tome on general relativity:

> "...the region r = 0 is a physical singularity of infinite tidal gravitational forces and infinite Riemann curvature. Any particle that falls into that singularity must be destroyed by those forces." (Misner, Thorne, and Wheeler, 1979)

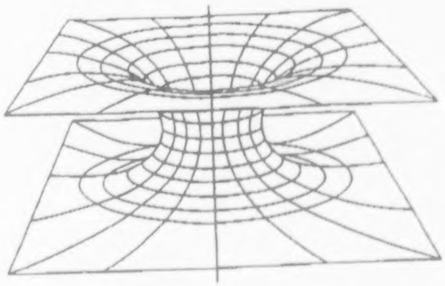
However, we who are outside the star's Schwarzschild radius will never see this happen. Once the star collapses within its Schwarzschild radius, nothing--not even light--can get out from inside the Schwarzschild radius. The star's mass is still tugging on us gravitationally, but we can see nothing that happens to the star when it is inside its Schwarzschild radius. A so-called black hole has been formed. The ultimate invisible object!

Visual Metaphor and the Marketing of Physics

This black hole scenario has been widely espoused and touted for a long time in arenas ranging from prestigious scientific journals to Reader's Digest, Walt Disney, and Star Trek. The arguments for the existence of black holes have been aided by the use of Madison Avenue-like words--black hole, white hole, worm hole, warped space-time--and eye-grabbing visuals such as shown in Figure 9. It is no wonder that the non-specialist audience accepts just about without question the validity of black holes.

However, some specialists who have some understanding of Einstein's theory of general relativity realize there is some shakiness in the foundation that holds up the popular edifice of black holes. Physical interpretations of the solutions of Einstein's mathematically complex field equations describing gravitational fields is far from trivial. In Newtonian physics there was no difficulty with the notions of space and time. Space was space, time was time, and that was it.

Figure 9



A WORMHOLE

It is important to understand--and this is usually not conveyed from specialists in physics theories to non-specialists--that the pictures resulting from mathematical equations in modern theories are not something that follow automatically like some God-given proclamation. In the end, in most modern physical theories the final (latest) visual representation results mostly from the minds of the persons who have come up with the most widely accepted interpretation.

The name "black hole" is a relatively recent terminology. The notion of the Schwarzschild radius was brought forth in 1916 when M. Schwarzschild solved exactly, for the case of spherical symmetry, the Einstein field equations, which were too complicated for Einstein, who came up with the theory a year earlier. Over the ensuing years, people wrestled with the interpretation of what happens around the Schwarzschild radius. It was not until the late 1960's that the visual metaphor "black hole" appeared in the literature. Now, black holes are everywhere, despite the lack of conclusive evidence. Because of what might be termed a “big noise approach,” the intrinsically invisible black hole has become very visible in the minds of many.

It is important to realize that, in spite of what may be suggested in many writings, there has to date been no absolutely conclusive evidence that a black hole has been experimentally detected. Also, there exist viable alternative interpretations other than black holes to solutions to the Einstein field equations (Gautreau, 1995; Gautreau and Cohen, in press a,b).

The pro and con views of black holes can be aptly summed up in the words of the following bumper sticker.

BLACK HOLES SUCK!

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Using Graphics for Integrated Planning

by Peggy A. P. Pruisner

Abstract

Across contemporary educational settings, there is an emphasis on meaning making, problem solving, and discovery in the learning process. In many schools, facts and concepts are no longer presented in a content-based framework; rather, they are fully integrated into the curriculum by a unifying theme that under girds the connections to the world of knowledge. To best represent the thinking of students in learning and the thinking of teachers in integrated planning, the use of graphics is both efficient, portraying much information in its design, and effective, facilitating communication.

Learning and Thinking

Paramount to learning is thinking. Although this statement may sound innocuous, hardly revolutionary, it is the impetus for a dramatic paradigm shift for educators. By emphasizing the contemporary schema-based and process-oriented approaches to literacy and meaning making, and by expanding on the relationships of learning and thinking, the integrated knowledge approach exploits the web of relationships discovered while participating in activities and tasks. The integrated planning that precedes teaching and learning allows learners to gather knowledge holistically.

Integrated Planning

Ackerman and Perkins (1989) suggest that within the integrated paradigm there exist a curriculum and a metacurriculum. The curriculum includes the substantive content and concepts that have comprised the content-driven curriculums of the past and the broader concepts of knowledge structures. Furthermore, the metacurriculum is made up of learning skills and strategies that help students learn the content being taught and foster thinking and independent learning. In any plan derived from the integrated paradigm, planning is no longer a linear and sequential task but involves a variety of paths and explorations based on the thinking and learning of students rather than the instructional agendas of teachers.

For example, creating an integrated unit on identity intended for secondary students, teachers collaboratively plan and provide instruction, activities, and experiences that allow students to explore character development and conflict (ordinarily taught in the framework of English, perhaps in the context of short stories), the importance of self-esteem (typically taught in the framework of health and wellness or guidance), the importance of identity in the family and society (perhaps previously taught in the area of social studies or possibly absent in the former curriculum), and continue in this manner across all curricular areas. This transformed approach to planning calls for new procedures and structures.

Integrated Planning and Graphics

Currently, many skeletal graphic models are recommended for use during the planning stages of integrated unit development. However, these models are either simple or hybrid models of the graphic web and do not adequately allow the curriculum planner to utilize the power of varied graphic forms to display the relationships of the concepts to be taught and the metacurriculum that fosters thinking.

Teachers need to look beyond the graphic web and select a graphic that fits the content or the objective and the thinking process involved. To best communicate the underlying thinking, a common language of graphics must be presented for graphics to be universally understood in integrated planning. Presenting direct instruction in the creation and use of graphic representations based on models of thinking along with the instruction for integrated unit planning utilizes the power of graphics to clarify and represent.

Graphics can represent the many forms of thinking. Hyerle (1996) recommends a hierarchy of graphical representations called thinking maps. His system is compatible with the levels of questioning utilized in most classrooms, and his graphic primitives are combined to represent various levels of thinking; for example, the bubble map and double bubble map primitives can be used in graphics for describing qualities and comparing and contrasting; he identifies both as forms of evaluative thinking.

Rakes, Rakes & Smith (1995) recommend the thinking processes involved in analysis, organization, and categorization be presented using the following graphic techniques: semantic maps, flow charts, labeling, tracing, text clues, adjunct questions, and drawings; the thinking involved in elaboration: drawings, charts, graphs, maps, and icons; and the thinking involved in integration: drawings, text questions accompanied by visuals, and pseudo graphics.

The aforementioned systems, although theoretically sound, require users to learn new terms and concepts. One system based on top-down and bottom-up thinking and portrayed using visual tools (Clarke, 1991), however, can make two claims: theoretically sound and pragmatic across all content areas. From a cognitive theory standpoint, there is widespread acceptance of its underpinning in schema theory (Rumelhart, 1980), and the recognition of reading, thinking, and comprehending as the interaction of reader and text across all content areas. Furthermore, the system is pragmatic for the curriculum planner who may not have an in-depth past experience with thinking graphically or who may not prefer the style of thinking with graphics. Using top-down and bottom-up thinking to guide the graphic selection facilitates planning and learning in an integrated framework for all contents, types, and levels of users.

Top-down and Bottom-up Graphics

Clarke (1991) suggests that top-down graphics aid deductive thinking and anchor abstract concepts, processes, rules, or procedures. Top-down visuals can test ideas against facts or solve specific problems by using concept maps to relate ideas to facts or ideas to other ideas, by using weighing scales, continuum lines, or pro/con charts to weigh evidence in support of opposing arguments, using force field diagrams to observe antithetical forces, using causal chain maps to see a model of a process, and using decision trees and if/then flow charts to assist in deciding between two choices. Finally, planning charts, path models, and procedural flow charts can be used to work through specific steps in a task. In contrast, bottom-up graphics that help students scan, sort, and organize information can include the following: time lines for representing chronological events to show trends, recurring patterns, or causes and effects; web diagrams to tie related events to a concept or idea; circle diagrams to guide students to illustrative group events; data grids, pie charts, and graphs to help count recurring events and draw inferences; Venn diagrams and complex matrices to help sort information into multiple categories; and inductive towers to help connect factual information and draw inductive inferences as the basis for theories and predictions.

Flexibility

Selecting graphics that communicate but are flexible in their power to represent complex thinking is essential. Guthrie (1996) warns against formula following in conceptually oriented reading instruction. He warns that if the teacher does not construct the design for planning, the classroom will not be engaged. Consequently, the purchase of a prepublished package by a school system is doomed to failure. The plan must be built on a consistent common language of graphics yet remain flexible for teacher use, and since the match needs to be explained to the students at the instructional stage, it should remain flexible for student input and responsive to student needs.

The graphical representations referred to in this top-down, bottom-up schema have widespread acceptance and understanding among readers, yet they are not excessively prescriptive in their design and certainly not in Clarke's recommended uses. They provide the common language of graphic tools that is needed while allowing for varied interpretation and flexible use by teachers and learners alike.

The Instructional Plan

Based on the need for integrated planning, the power of graphics to communicate those plans, and appropriate match of top-down, bottom-up graphics to student outcomes across all curricular areas, the author has designed and utilized the following directions for integrated planning at inservice presentations and with preservice students at the undergraduate level:

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Planning Integrated Units:

Step 1: Consider the system outcomes established by the school
Step 2: Identify an organizing center: theme, topic, problem, issue that cuts across curricular boundaries; establish theme, concepts, and generalizations
Step 3: Establish general unit objectives: design integrated plan to reflect the underlying top-down, bottom-up thinking students will be using in this unit:

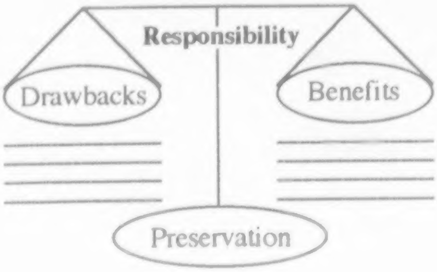
1. Brainstorm and record information needed to achieve critical objectives.
2. Consider the thinking that undergirds student learning: top-down, bottom-up thinking.
3. Review and select appropriate graphics (Clarke, 1991) to represent thinking processes.
4. In drawing the unit graphic representation, consider the following characteristics and their relationships:
    - •composition
        - -organization
        - -center of interest
    - •shapes
    - •sizes
    - •colors
    - •pictorial elements.
5. After drawing your graphic, ask someone unfamiliar with the content but who thinks visually to explain what can be determined from your drawing. Revise as needed to communicate more effectively.
6. Prepare the graphic for including the information derived in the planning *steps*. *Steps 1-7* include the systems outcomes, theme, concepts, generalizations, unit objectives, resources, instructional procedures, unit introduction, development, culmination, and plan for evaluation; these are to be written in the areas that seem most appropriate for the graphic chosen, so be creative but purposeful in this process. Because of the limitations of the graphic design or simply because of space considerations, these may be listed and referred to on the graphic and attached in their entirety using additional paper.

Step 4: Brainstorm resources and procedures
Step 5: Gather resources
Step 6: Design instructional procedures: unit introduction, development, and culmination
Step 7: Plan evaluation
Step 8: Schedule unit events

Example Integrated Units

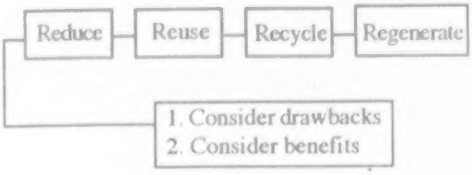
Utilizing the integrated planning graphics, imagine that a group of collaborating teachers considers a variety of outcomes for a unit on environmental responsibility. Their initial plan emphasizes weighing the benefits and drawbacks of preserving the environment and recycling waste, an example of top-down thinking (see Figure 1).

Figure 1
ENVIRONMENTAL RESPONSIBILITY
Balance Scale



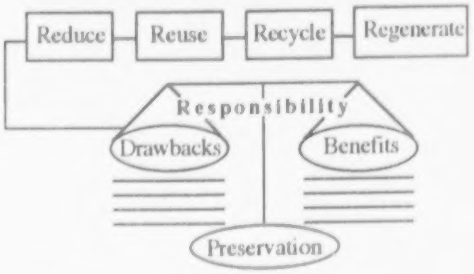
The ongoing dialogue among the teachers emphasizes the need for individual action. Therefore, a planning chart, another example of top-down thinking, is an effective graphic representation of another desirable outcome of the unit (see Figure 2).

Figure 2
ENVIRONMENTAL RESPONSIBILITY
Preservation Planning Chart



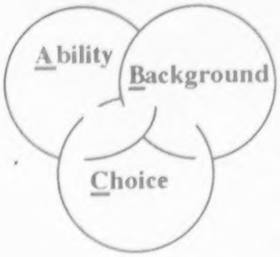
By integrating the content, the outcomes, and the representative thinking required, a revised graphic that combines the two previous models is created. The new graphic provides the background structure for continuing the planning process where resources, instruction, and evaluation can be recorded (see Figure 3).

Figure 3
ENVIRONMENTAL RESPONSIBILITY
Balance Scale/Planning Chart


Reduce
Reuse
Recycle
Regenerate
Responsibility
Drawbacks
Benefits
Preservation

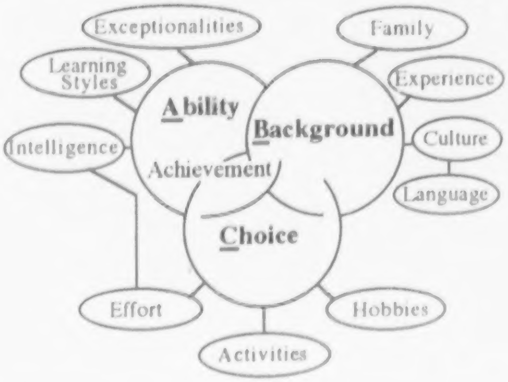
Another educational team working on the topic of diversity contemplates an outcome requiring students to look at the characteristics of diversity across several categories; a Venn diagram is an appropriate bottom-up graphic (see Figure 4).

Figure 4
ABCs of DIVERSITY
Venn Diagram


Ability
Background
Choice

Recognizing that students will need to understand the relationships of those categories and their component parts, they design another bottom-up graphic, a web, extending from the Venn diagram. However, as they discuss the relationships of the components, it becomes apparent that other relationships must be considered; for example, the interrelationship of ability and effort can result in a level of achievement. Consequently, further linkages transform the web into a concept map (see Figure 5).

Figure 5
ABCs of DIVERSITY
Venn Diagram


Exceptionalities
Family
Learning Styles
Experience
Ability
Background
Intelligence
Culture
Achievement
Language
Choice
Effort
Hobbies
Activities

In Conclusion

When recognized for their strength, the capacity to concisely communicate meaning, and respected in spite of their limitation, the difficulty of representing the complexities of thinking in a confined space, graphics can be powerful tools in the hands of curriculum planners. Graphics can help clarify the thinking that accompanies planning and can direct the thinking that facilitates student learning. The representation of that student engagement in the act of thinking can be concisely portrayed with graphics when there is consistent use of clearly defined graphics, a match to the process of thinking, and a respect for the gestalt of learning.

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Story Re-Visions: Tales For The Future

by Jacqueline W. Gray

Abstract

Stories are habitations through which we live. The glasses through which we see and interpret the world are constructed through our life stories. The lenses are the prescription that focuses our individual experiences. When using an inaccurate lens, things look blurry, distorted and, many times, scary. The theory, construction and re-vision of life stories provide a basis for the interpretation of past events and future expectations. This paper looks at enrichment of our storied lives through color, spontaneity, diversity and creativity cause a new level of excitement. It explores how being unique can capture the greatest prize--the self.

Introduction

When dealing with people, Freud and others since, have noticed the human's inclination to describe themselves narratively as a means to know and identify themselves. Freud found the word *self* too nebulous and used instead the German word *seele*, this best translates into English as *soul*, but English translations of Freud's work used *mind* instead. Jung and Rogers moved modern psychology more toward the idea of *self* and the development of a single *selfhood* (Parry, and Doan, 1994).

The terms *cognitive* and *post-cognitive* have been used to distinguish between modernist and postmodernist, as well as *epistemological* and *ontological*, to construct the division between the two "eras" (McHale, 1992). McHale discusses poet, composer, performing artist Dick Higgin's concept of *cognitive* and *post-cognitive* with the following questions:

The cognitive questions:

"How can I interpret this world of which I am part? And what am I in it?"

(Asked by most artists of the 20th century, Platonic or Aristotelian, until around 1958.)

The post-cognitive questions:

"Which world is this? What is to be done in it? Which of my selves is to do it?"

(Asked by most artists since then; quoted in McHale, 1992, pp. 32-33.)

While artists began to look at the world in a new way, the therapeutic world continued with the dichotomy of cognition and emotion. As post-modernists begin looking at the many selves, they interweave those threads each self into the tapestry of emotion, cognition and other constructs that become the total "self."

Hermans' (1992) Valuation Theory describes the self as an organized process of valuation. He believed the individual's meanings of events are articulated in a self-narrative, or life story, that is organized and re-organized over time. Because there are emotional reasons an individual dwells on some part of their life story and neglects other parts, the person becomes a motivated storyteller.

Bruner (1986) described two modes of thought, propositional thought and narrative thought. Propositional thought consists of logical argumentation aimed at convincing one of some abstract, concept-independent truth; a logicoscientific and paradigmatic aim at theoretical, formal interpretation of a general abstract paradigm for gaining understanding. Narrative thought, conversely, presents concrete human and interpersonal situations to demonstrate their particular validity. The story mode requires imagination, an understanding of human intention, and an appreciation of the particulars of time and place. Narratives focus on people and on the cause of their actions: their intentions, goals, and subjective experience. Properties of character, setting and action are central to the narrative mode (Vitz, 1990).

Kelly (1955) contributed the prototypic model of psychotherapy with the use of narrative reconstruction in his work with the client's self-characterizations. Kelly's perspective has become integrated into postmodern approaches to psychology. Constructivist psychotherapy is described as a postmodern epistemology in which proactive, self-organizing features of human knowing is emphasized (Neimeyer, 1993). From this view one is an active participant in creating their understanding and view of the world.

Vitz (1990) supplied a psychological basis for the use of stories in teaching moral development. Language as used in teaching is usually in the written form of a text, without much emotion, limited in image value, and generally context-free, to express the universal truth of paradigmatic knowledge. When the propositional thought is introduced as fact there is little emotional involvement, and the left hemisphere of the brain primarily used. When telling or writing a story, language takes on a heavy emotional and imaginistic meaning, usually carried by the intonation and words with associated images. This adds depth and flesh (Cataldi, 1993) to the story by incorporating syncretic thought. Syncretic thought is associated with general emotional processing, recognition and affective language (Vitz, 1990). Syncretic thought utilizes analog cognition and knowledge by relating the affective with the cognitive. Vitz (1990) proposes a more complete and evolved learning experience created by using situational truth presented in a narrative format such as Aesop's Fables and current real moral dilemmas. Morality is grounded in personal emotional experience and understanding should be evident from personal virtues (MacIntyre, 1981).

According to Sarbin (1986) narrative is important in our lives because "...our plannings, our rememberings, even our loving and hating, are guided by narrative plots." He went on to explain that moral choice is particularly illuminated by understanding the relevance of a given moral issue to a person's understanding of their life as a story. The life story or self-narrative can either be a self-constructed story of one's life, often including bits and pieces of various other stories, or an almost literal acting out of life according to a narrative model.

Narrative provides a more complete and multidimensional understanding of events, emotions and an individual's life script than just relating the paradigmatic aspects of the situation. By using this narrative model one can explore the past, examine it's effect on the present and determine how all that has been learned can be related to planning for the future.

Life Stories

Howard (1991) described identity as a life story which individuals begin constructing, consciously or unconsciously, in late adolescence. Like stories, identities may assume a "good" form--a narrative coherence and consistency-- or they may be illformed. The life story model of identity suggests how anyone seeking to know the whole person may apprehend identity in narrative terms.

At an early age, children ask parents endless questions. The questions generally fit into the generic form: "How can I understand (make sense of) these puzzling aspects of my experience?" The repeated questions attempt to get a story that will give them a context and a culture in a form that makes the answer make sense (Howard, 1991). For example, the question, "Why do birds fly?" is an attempt to get a narrative (story) response that makes sense at the child's developmental level. To answer in short statements then provokes more questions until the need for narrative context is satisfied (McAdams, 1985). Mair (1988) described stories as habitations. These narrative responses are how children make sense of their lives and develop their view of the world. Along with those provided by parents, narratives come in the forms of cartoons to full length feature movies that portray conflicts of good and evil, issues of life and death, as well as the role of love and hate in human interactions (Bettelheim, 1976).

Writing one's life story gives spaciotemporal structure to the separate events and expectations by sequencing and determining relevance (Howard, Maerlender, Myers, and Curtin, 1992; Hermans, 1991). Perhaps the most important information people convey when they write their life history, or autobiography, is their life theme (Howard, et al., 1992). A life theme or script includes the plan, values, beliefs that are repeatedly played out in the interactions in a person's life (Berne, 1972). Life stories are tailored toward revealing an understanding of a construct that questionnaires, role playing, behavioral measures, projective measures, etcetera are hard pressed to accurately assess.

When asked to write their life story, the individual usually does not start with "I was born on September 2, 1951 to Harold and Peggy Westfahl." Individual's identify significant events or times of their life upon which to focus. The events they choose and how those events are interpreted reveal the individual's perspective of life, in general. Are they achievers who select stories of their successful events? Are they victims who always see someone else as responsible and taking advantage of them? Whatever events are chosen the color and dimension of the emotions and thoughts that make those events significant help the reader to know more about the individual than if they only stated the facts. Themes will emerge from the stories whether religious affiliations, racial or ethnic ties, gender orientation, professional identity, or family tradition and history (Parry and Doan, 1994). It may also reveal how an individual interacts with others, solves problems and overcomes obstacles.

Many times individuals expect their lives to be like a trip down a super highway--straight, smooth and fast. If the road is bumpy, we encounter potholes or detours, or if we take a side trip it is interpreted as failure. Years later, when re-membering past events, it is usually the eventful trips we are most likely to recall. These diversions add the color, depth and dimension to our experiences because we have revised the script turning it into an adventure. Whether those rough roads include obstacles of hardship and adversity through issues of race, class, gender, age or other aspect, they play a part in who the individual is, how they use the events and how they re-member the incident (Moffitt and Singer, 1994).

Story Re-Vision

Through the process of telling and retelling one's self-narrative or autobiography, the affective and motivational characteristics of the storyteller are revealed including their beliefs and values (Hermans, 1992). As the story is retold, it undergoes changes. The individual utilizes their values, beliefs, experiences and affect with respect to their personal development, life crisis, class, gender, and other bumps and barriers along the road to re-view the experience and allow changes to take place in how they interpret the event. As the previous interpretation is deconstructed, taken apart for examination, it allows a new interpretation to be constructed, rebuilt from new information and interpretation resulting in altered beliefs and affect (Hermans, 1992; Parry and Doan, 1994; White and Epston, 1990). By utilizing story re-vision an individual not only examines the past, but applies it to the present, and projects its impact upon the future (Hermans, 1992).

When my children were small they read books called "Choose Your Own Adventures". These books were read and re-read time and again because every few pages a choice needed to be made for the character. Depending upon which choice they made the book directed them to turn to a specific page. Each time the book was read it became a different story because the decisions could be changed.

The original life story can be examined for constraining rules or restrictions that limit the individual's ability to explore their world. Biases and prejudices can be reexamined. A person's life theme will become more evident with the re-telling of the story since those aspects of events will be continued through the re-visions (Hermans, 1992). By reevaluating the events as they appear in the original story they may begin to see strengths and accomplishments that may not have developed without the challenges, adventures, obstacles, or difficulties that brought them from the past to the present. Hermans (1992) indicated that stories change over time with the re-telling and re-vision especially during times of disruption whether circumstantial or developmental.

An Illustration

In the story of "The Wizard of Oz" (Baum, 1956), all Dorothy, the Tin Woodsman, the Scarecrow and the Lion need to do was find the Wizard and their problems were solved. In Richard Gardner's (1980) story of "Dorothy and the Lizard of Oz" we find that the simple solutions to problems the Wizard provided did not really solve any of their problems. Dorothy returned to Kansas to find she still needed to deal with the sheriff about her dog, Toto. The Scarecrow had a diploma, but he returned to the farm where he'd worked to find another scarecrow doing his old job and no one willing to give him the chance to do a job that took a brain just because he had a diploma. The Tin Woodsman returned to his home to find that having something ticking on his chest did not make him feel any more loved. Just showing his "heart" to others did not make them love him more either. The Cowardly Lion proudly showed his medal for bravery and courage, but it did not take away the fear when he was confronted by dangerous situations. It took more than simple solutions for each of them to find the characteristics deep within themselves.

Similarly, when individuals' write their life stories, they may seek simple and magical solutions. Through the Re-Vision process they may see deep within themselves the very thing they thought they lacked.

This is a re-vision of a familiar story. Gardner identified the fallacies of the original story and provided a re-vision that retained the facts from the original story and constructed new interpretations within those parameters.

Therapeutic Implications

A rising form of intervention in psychotherapy is the life story, which is a condensed psychobiography that focuses on the role of the symptomatic complaint in the client's life-journey (Omer, 1993). It is not the life story that is so new as the use of story re-vision to reconstruct the life history and change the client's view, or interpretation, of the events (Parry and Doan, 1994). The next step involves the client projecting into the future to construct ways their new view of these past experiences can help the client reach their personal goals (Hermans, 1992).

The Preventionist Application

By implementing these ideas with children as they learn about stories and storytelling, re-visioning experiences could provide a means to deconstruct dysfunctional ideas before they become in deep ruts in their behavioral road making change of direction more difficult. This approach also allows for re-visiting these stories at a later date when the individual has more information and experience to further re-view and implement more re-vision for the future.

Conclusions

Through the story re-visions events that may have been viewed as problems, burdens, potholes, ruts, obstacles or difficulties over the course of time are reconstructed revealing the adventure, excitement, humor, color, and depth that can spur strength, growth and learning. These re-visions allow us to ponder the scenes from new directions and perspectives that provide insights that were not previously believed as possible. The possibilities story re-visions provide to not only psychotherapy, but also to education, literature, theater and video tape are endless. The development of virtual reality computer games that provide children with consequences of decisions and opportunities to revise their story and improve their choices is only one new aspect of an old educational tool.

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Celebrating Cody
An Opportunity To Present A Visual History

by Carmela A. Conning and Jeannie Cook

Abstract

This paper presents the various projects that we developed to enhance the celebration of the 100th anniversary of the founding of the town of Cody. In the process of supplying information for the anniversary events, we were able to preserve our local history and educate the community.

If we do not know where we have been it is difficult to know where we're going. Our society is becoming one of bytes, immediate solutions and instant gratification. We have raised a generation with a short attention span and an unwillingness to devote a great deal of time and effort to master any activity. Naturally, there are exceptions to any general statement of this type, but we are not here to deal with exceptions. Our focus is the audience that is always in a hurry and needs their interest immediately captured. From our eight years of working experience we have learned that the public's attention has to be grabbed visually if we are to be successful. Therefore, we must design materials of high visual impact to accomplish our goals of preservation, education and a further quest for knowledge.

The Park County Historical Society Archives (Cody, Wyoming) was able to take advantage of the 100th anniversary of the town of Cody and the 150th birthday of Colonel William F. Cody (Buffalo Bill) to educate and preserve our local history. The celebrations surrounding the anniversary of Cody have provided us with ample opportunities to preserve, educate and promote our history and heritage. Our funding comes from Park County and is shared among three offices - Cody, Powell and Meeteetse. Understandably, we receive a minuscule portion of the county budget. The town of Cody did have a Centennial budget that we were able to tap into to finance some of our projects. Other projects did require additional fundraising and were accomplished with the assistance of groups and businesses in town. These visual projects can be adapted by any person or group. Our guidelines required brief written descriptions and heavy use of photographs whenever possible.

Selling our projects required convincing business groups that money could be made from history! They could be sponsors, enjoy positive publicity and contribute to the preservation of local culture and lore.

Some of the visual projects we have developed are - The Hooks:

1) Slide show detailing Cody's growth from 1896 to the 1920's. This show was presented to various organizations and to the students attending the three elementary schools. The civic organizations that viewed the slide show were solicited for funds to provide for the duplication of the show. Copies of the show were to be donated to each school and the public library. This effort generated enough funds to produce three copies of the slide show.

2) 100 year pictorial history of the town. We would maximize the use of photographs in book format to trace the main trends in the town's development. We raised $78,000 from 12 local banks and individuals who agreed to sponsor the book by providing an interest free loan.

After all expenses are met any profit will be retained by the Historical Society.

3) Tapestry displaying several buildings important to local history. Unfortunately, most of these buildings have been destroyed. Funding for this project was acquired from the Centennial Committee. The proceeds from this project will eventually be given to the Historical Society.

4) Centennial calendar using old photographs of the town and Colonel William F. Cody and his family. Events important to local history were presented and important dates were emphasized. This was a cooperative effort between the Buffalo Bill Historical Center, the Centennial Committee and our office.

5) Weekly photographs and stories published in the local newspaper, the Cody Enterprise. Photographs were essential to this effort. We needed to grab the reader's interest so the articles would be read. This was a project of mutual benefit that did not require any outlay of money. We supplied information that was already in our files. Every Monday the paper carries the "Centennial" pages. These articles have proved to be extremely popular and increased the Enterprise's sales.

6) Pictorial exhibits dealing with various topics - the history of the Cody library, and the important women in the town's past. The Cody public library supplied display space for these projects. Again, this was a low-cost project of mutual benefit. Color photocopying of photographs is inexpensive and preserves the originals.

7) Display cases and panels filled with appropriate materials at the Park County courthouse. These projects were designed and implemented by a University of Wyoming Public Relations intern, Christy Cook. The artifacts and materials were loaned or given to our office by various individuals.

8) Supplied photographs and information on several topics for school projects. Visual materials were the main focus of these requests. Photocopying of materials made this a low-cost service.

9) Helped revise the Walking Tour for the town of Cody. We needed to supply photographs and information on buildings. Funds for the publication of the Cody Walking Tour was supplied by the Centennial Committee. The Historical Society will receive the proceeds from the sale of the tours at the conclusion of the Centennial year.

10) Helped acquire artifacts, materials, photographs and information for the Centennial display sponsored by the Buffalo Bill Historical Center. Any costs for display purposes were absorbed by the Historical Center.

11) Supplied information used in the kiosks erected at three sites around town. The kiosks were paid for by the Centennial Committee.

12) Tim White's video production of Cody's first 100 years. This is a work in progress. The format of this production will be similar to that used by the PBS in its Civil War series. Our office will supply research, photographs and local contacts. The projected date for the completion of this video is 1997. Mr. White is raising the money required for this endeavor and is graciously giving the Historical Society the proceeds.

13) Supplied information for a web site on the Internet. We chose six photographs and three articles on Cody history.

14) Historical Markers for the Northfork Highway (road to Yellowstone National Park). This was a cooperative venture with the United States Forest Service. In honor of Buffalo Bill's 150th birthday, the highway was renamed the Buffalo Bill Scenic Byway. We also have a cooperative agreement between our office, the United States Bureau of Land Management, local groups and individuals to provide research, narrative, photographs or sketches and some funds to erect additional markers in the area.

The Centennial of the town of Cody gave the Park County Historical Society Archives office a unique opportunity: an opportunity to disseminate knowledge. We used as many visual formats as we reasonably could considering time and money. We feel that we have made an important contribution to preserving our history and making the public aware of the community's past.

Visual Learning in Field Biology

by Ethel D. Stanley

Abstract

As in other disciplines, the study of biology presents an evolving set of visual learning, visual thinking, and visual communication requirements. Visual learning has long been recognized as an integral process in educating biology undergraduates who must develop specific visual skills and knowledge in order to communicate and work with the extensive visual culture shared by practicing biologists. In this paper, a number of visual tasks necessary to field study within the biological sciences are identified and the proactive design of visual learning experiences is urged.

Individuals, no matter their age, view the world through experienced eyes. However, anyone who has been on a field trip designed to give you the opportunity to see things you've never seen before, can relate how variability in individual knowledge and visual practice makes "looking" considerably more complicated than just "opening your eyes."

Consider the following activities of practicing field biologists:

1) A paleobotanist systematically examines a fossil and suggests that it is a stem from a cycad that might have been found in the area nearly 200 million years ago.

2) A field evaluator makes notes on the extent of aphid damage to beans after inspecting only one or two plants and quickly scanning the color of the field.

3) As a result of studying a water sample under a microscope, a forensic phycologist states that a diatom bloom is responsible for the odd color and odor observed in the company's hot water ditch.

In each of these scenarios, a biologist is shown using specific visual literacy skills and knowledge. Each had to become proficient with a visual language that enabled them to store and retrieve specific images as well as communicate about them. Did they accomplish this learning as a result of performing specific visual tasks? Are there learning conditions necessary to develop this "coming to know?" Is there a current concept of visual learning within the biological sciences that helps define these conditions?

Although observation is considered essential to all biological investigations, visual learning itself is somewhat unevenly addressed and the concept of what it means to be visually literate in biology is largely ignored. Nonetheless, students majoring in the biological sciences not only must develop specific visual skills such as microscopic examination of tissues or field identification of organisms, but also utilize their knowledge of images for thinking and communicating. They continue to build and rely on this visual literacy throughout their educational and professional lives.

Educators in the biological sciences have long recognized the value of observation. Cooper (1917, p.12) presents this student view of learning under the supervision of the well known naturalist, Louis Agassiz, in his Harvard lab during the 1860's .

"Observation and comparison being in his opinion the intellectual tools most indispensable to the naturalist, his first lesson was one in looking. He gave no assistance; he simply left his student with the specimen, telling him to use his eyes diligently, and report upon what he saw. "

Observing and illustrating specimens remained a dominant form of learning at least through the first half of this century. It is hardly surprising to learn that "the making of 'carefully prepared detailed drawings' is a commonly required college laboratory activity in the biological sciences" (Johnson 1940, p.70). At the same time, visual components were introduced and increased in number and type in both texts and laboratory manuals. For example, eighty-five separate illustrations appeared in the first hundred pages of a commonly used undergraduate text, Introduction to Botany, written by Bergen & Caldwell (1939). This trend continues today. Blystone & Barnard (1988) compared college biology major textbooks in the 1950's with those of the 1980's. Use of photographs increased nearly threefold. Learners process more visual messages than ever before in the present day biology classroom:

"Illustrations have become an essential part of the biology learning experience, encompassing graphs, charts, flowcharts, diagrams, line drawings, photographs,and symbols, illustrations are found in textbooks, computer programs, instructional audiovisual media, and even classroom wall coverings" (Blystone 1989, p. 155).

Images are also generated by biology students. Knorr-Cetina & Amann (1990, p. 259) report "the focus of many laboratory activities is not texts, but images and displays." These are not passive media, but "objects on which work is performed in the laboratory; like other materials handled in the stream of laboratory activities, they are processed" (Knorr-Cetina & Amann 1990, p. 262).

Visual learning involves the synthesis of images as well. White (1988, p.152) writes:

"Science learning involves much processing of images. As well as learning many propositions and intellectual skills, we build up representations of unobservables such as electrons and magnetic fields, processes such as dissolving and burning,and generalizations such as sedimentary rock and plant cells."

With the proliferation of images encountered in biological education and the growing need to deal with them on an individual and professional basis, conceptual frameworks such as "visual learning" and "visual literacy" are increasingly relevant and should be considered actively within the educational setting. Visual learning can be defined as "the acquisition and construction of knowledge as a result of interaction with visual phenonema." (Seels 1994, p. 107). It is an important component of visual literacy, "the ability to understand and use images, including the ability to think, learn, and express oneself in terms of images" (Braden & Hortin 1982, p. 41).

Biology in the Field

Student experiences with field observations and the development and application of verbal/visual language in the field setting are often problematic. One way of improving the design of field experiences in biology is to consider the kinds of visual tasks that are required for learning. Activities that experienced and inexperienced field biologists must engage in should be examined. Students may be unaware of specific visual strategies that could enhance their field experiences. Examples of expected performance as well as opportunities to practice in order to develop visual expertise are needed.

Field biologists often begin by isolating an organism in the field using characteristics such as relative size, placement in a general community, association with other organisms including those like itself, critical behaviors, and key physical features. For example, in order to locate Prairie Dock in central Illinois during July, a botanist might look for this 4-8 foot flowering plant in remnant prairie areas found along railroad tracks. Other plants found with Prairie Dock include Compass Plant, Big Bluestem, and Blazing Star. Bright yellow flower heads towering over very large elephant ear-like leaves clustered at ground level and half hidden by grasses are key physical features.

Experienced observers frequently create search images which are practiced and revised as they encounter the organism under a variety of conditions. Identification deals with individual variation among living specimens. This often requires active assessment of visually complicated information. Experienced biologists use some subset of this information to shorten the identification process. For example, a search image for Rosinweed, a member of the Silphium genus like Prairie Dock and Compass Plant, might be simply the right angle formed where the stiff horizontal leaves meet the stem.

Beginning observers also try to shortcut the process. They often rely on drawings made by professionals that represent the typical specimen most likely to be encountered. Representation of a species in a single black and white diagram may function well for an expert, but may fail by not conveying detailed constructs to novice learners. Grinnell (1987) points out that "an observer's ability to recognize 'one of these' depends on being able to recognize the form of the object." These objects "have gestalt" in which "arrangement of component features provides information not apparent in the features alone."

When students depend on a single image to identify a specimen, they may be unable to deal with the diversity within a population of similar specimens. This concern is not limited to recent educators. Curtis(1897, p. viii) emphasized in his textbook of botany:

> "...a variety of species have been used rather than a few types, since...this, above all, preimvents those false generalizations and conceptions that must follow a narrow study of forms."

Also, most biology students are unaware of the role of the scientific illustrator in creating these images. A sketch of a plant could reflect that the illustrator "knows what the plant is like in other views, and organizes an image with a greater richness of content" (Arber 1950, p. 210). Often the organism is enhanced to "show off" the distinctive features as field marks.

Another complication for beginners is the limited observation time in the field. Learners may be required to discriminate between distinctive features of a flying insect at a glance. Did that insect have long antennae or long cerci? Were the mouthparts for chewing? Perhaps the specimen can only be encountered in the field under special conditions. Identification of stunned fish following electroshocking may be limited to 90 seconds depending on the size of the fish.

The most common tools for field identification are the field manual and dichotomous key. Both require surprising familiarity with terms and images. Although field manuals contain sections that provide defintions of terms, illustrations of several types, and tutorial information, the learner may find this description information inadequate until several specimens can be examined. These manuals are awkward to access when they are needed most, ie. upon encountering specimens that the learner is unfamiliar with. These texts often require the learner to refer to two or more pages repeatedly in order to eliminate the confusion between similar specimens. The dichotomous key requires students to work linearly towards an identification. Misidentifying a grass because you missed an ambiguous, but critical glume character in an early step is especially frustrating!

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Finally, the expectation of the learner is an essential component of the visual experience. Beveridge (1957) warned, "We are prone to see what lies behind our eyes, not in front of them." Searfoss (1995) advises novice observers to "beware of your preconceptions." The ability to identify an object requires more than general familiarity of forms, but also judgments made based on re-examination of the nature of that familiarity. Field studies that incorporate collaborative investigations in which an observer must communicate with others about what is being observed may provide this kind of practice.

Visual tasks associated with field biology that have been discussed here include the identification and assessment of critical features and contextual characteristics, development of short-cut discriminatory practices, the use of illustrative images, the use of dichotomous keys and field manuals with precise verbal-visual languages, and the need to recognize the power of expectation. Some of the difficulties that students encounter when carrying out these tasks are also described. Both visual tasks and the nature of the problems learners face should be considered in designing meaningful visual learning experiences in field biology.

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Imagery, Concept Formation And Creativity-From Past To Future

Asael Silverstein Ora. N

Abstract

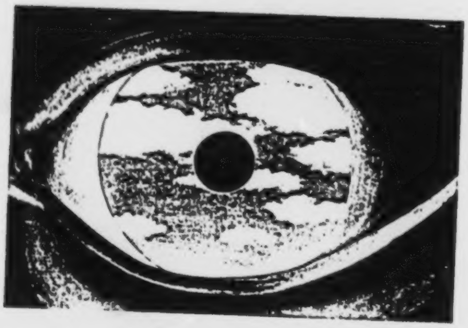
A look at the process of the imaginative formation of one concept, "a cloud", is presented here. The paper exposes the creative, artistic and scientific visual thinking of one child: Sagee Kopel, in the continuum of his fourth year. The author has been involved in an ongoing research on "picture language" focusing on the American Indian pictography. The present paper deals with this ongoing research and some of its preliminary findings are referred to as well.

Introduction

The importance of creativity for the individual and society is beyond question. The use of tools and languages enables humans to make new entities and abstract communications and to develop the arts and sciences. This makes a clear distinction between the human race and the other species on our planet. Visual Literacy and capacity are engaged with thinking and thus with new formations, in the learning process and concept formation. Paivio (1991), and Miller and Burton stated that the encoded images, alongside our verbal vocabularies act upon human cognition, information processing and the communication processes.

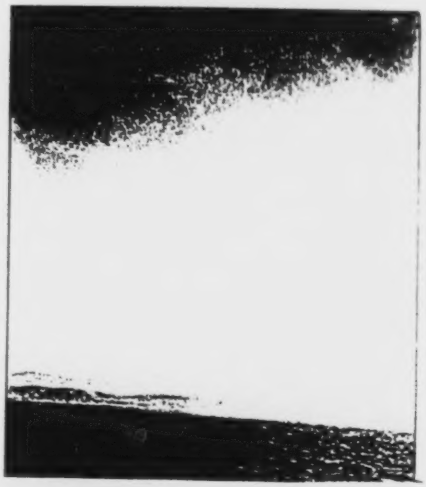
There is also a great amount of literature by Gregory, Arenheim, Goodman and Gombrich backing the approach that human perception is based mostly on visual capacity (Fig. 1).

Figure 1
Postcard. Magritte, An Eye



This paper intends to present a part of an ongoing research in what the author calls: picture language (1996). One of the children in the study group (1995), was privately examined during 1996. Starting when he was three years old he is on follow-up of his thinking and activities concerning one concept: the cloud. (Fig. 2)

Figure 2
Clouds Above the Sea

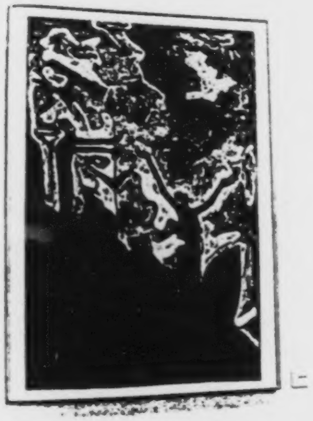


The theoretical background, the results and a discussion of this procedure are given hereby.

Theoretical Background

According to Ausubel, Novak & Hnesian (1968), the concepts are tools with which the outside and inside worlds of the individual are experienced while human thinking occurs. Howard wrote that every stimulation can be placed by the mind in one of many categories. The concept is a mental representation of a category (1987). In the process of abstraction, a given concept in our individual cognitive system conceals a personal experience, which gives the concept an idiosyncratic character (Fig. 3). The private human experience goes through processes towards selectivity, simplification, abstraction, generalization and schematization, and is not a loyal representation of the sensual absorption.

Figure 3
Clouds. Painting by A. Ofek



The writers claim that it is important to distinguish between the common concept of a culture and the personal concept of a given entity. Norman (1980) investigated the cognitive system. His experiments show that the memory impressions start with a sensational memory. Norman calls the registration of the sensual perception that accumulates in the sensual memory, an image. Thus, at the center of the conceptual framework there is the visual imagery.

According to these authors, the personal imagery is idiosyncratic, and common critical attributes are designed in every given culture by symbols. In "Man and Symbols" (1961), the last work by C.G. Jung, the author expresses his thought that imaginative thinking is the basic character of the human being. In this book he wrote that every concept in our conscious mind has its own psychic associations. Our imagination and intuition are vital to understanding and equally vital for the arts and all sciences. In the same book, and in Jung's words, M.L von Franz writes that in humans, the archetypes of the unconscious can act as creative forces. Archetypes are the patterns of emotional and mental behavior in man. They are built of archetypal symbols and are the source of creative ideas.

The notion of the perception of scientific symbols versus artistic symbols presenting the same concepts was studied by the author (1991, 1992). In another paper (1995), the author discusses the hidden power of picture language of ancient cultures.

Pictures showing symbols of different concepts in the Samarian, Egyptian, Chinese, Aztec and American Indian cultures are given in Fig. 9.

The author was impressed by the Native American Indian pictography, which shows correlation between gesture speech and verbal speech. Being a culture in which the visual was used consciously for expression and communication, it is suitable for the detection of human communication and mental operation. The author studied the American Indian picture language (Fig. 5, 6) on 10 Israeli young children (1996).

Apparently, each concept such as: earth, water, horizon, has its image for the ego.

Shoham enlightens the understanding of the human processes of creativity. He writes (1977) that the continuity of our personality lays two different system entities opposing each other. One depends upon perception of space, time and cause, and therefore its cognitive disposition is built on logos, pace and sequentiality. The second is totalitarian, out of time and synchronistic and acts by the penetration of intuition and by mystic experiences. The authentic creator projects on his creativity his ontological feeling of uniqueness. An authentic creativity bears a clear seal of the special configuration of the creator.

A. Cohen (1990), who focuses on the inter-relations of psychology and literature, writes that the child needs a tool in order to escape fears and tensions. He writes that the narratives and legends are an excellent catharsis for conflict transfer.

The research

Background

The follow-up of one child in the process of building one concept, is given here. The child is Sagee Kopel. The concept: "a cloud".

When Sagee was three years old, he told me that he wanted to live on a cloud. It bothered me and I decided to ask him more about it. The next time I saw Sagee I asked him why does he want to live on a cloud and he told me his story. I was taken by it and promised to write it down for him. When I found time I took Sagee to my study. We sat together near my computer and I wrote the story in the child's words. It was during our second conversation about the hydrological cycle, that was focusing on the concept: "a cloud", that Sagee created in his verbal language and picture writing, more of his own metaphors of the concept. I could not ignore the process of combining artistic and scientific meanings to a whole imaginative thinking, which I behold.

"A Boy Who Lives on a Cloud"

(Sagee's story, translated from Hebrew).

"The boy who lives on a cloud is me. My name is Sagee. I am three and a half years old. Together with me are my mother Yonat and father Omry. Also my brother Ofir that was born after me. I am the firstborn and Ofir is younger than me (Fig. 4)

Figure 4
Sagee and Ofir

In the cloud-house I have a ladder. Up in the sky there are birds and butterflies that I love. Down on the earth there are many animals, friends of mine that I love, and cars in the street. The rhinoceros that I ride, the elephants and tigers that I hug and also snakes, scorpions and monkeys. I do not beat them and do not kill them. The snake does not bite me. The scorpion does not pinch me. I also do not beat them and do not kill them.

We all use the ladder to go down and do not push. Father takes the blue car to work and sometimes the white car. Mother takes always the white car.

I am not afraid to live on a cloud. I love to be in a cloud house and to go down by the ladder without fear. Sometimes I hold birdflies (he made one word from birds and butterflies) and snakes and scorpions in my hands.

In my story there are no blows, "Bums Trachs" and no violence, therefore I am in a cloud."

I tried not to interfere with the story. It was only later on that I realized that it could be a good idea to have an observer.

The "scientific conversation"

Background

The entire experimental process, observation and writing were carried out by the author. Again, no external observer. The experiment took place both in the kitchen and outdoors. The kitchen opens to a loan facing west, few kilometers from the Mediterranean sea. It was taken in august 1995 when Sagee was 4 years old. I had a former conversation with him in the winter of that same year and at the same place. Sagee Told his "story" in December and I wrote it down for him around January 96. All 4 activities took place in one year. For his forth birthday I produced 10 books of his story. Each book has his own original drawings.

The second conversation

O: Ora. S: Sagee.

I looked at the sky and asked: how is the sky in the summer? S: A lot of sun, the color is blue. O: How is the sky in the winter?

S: Cloudy. O: What are clouds, do you

Figure 5
The Picture Language of the American Indians (a test tool)

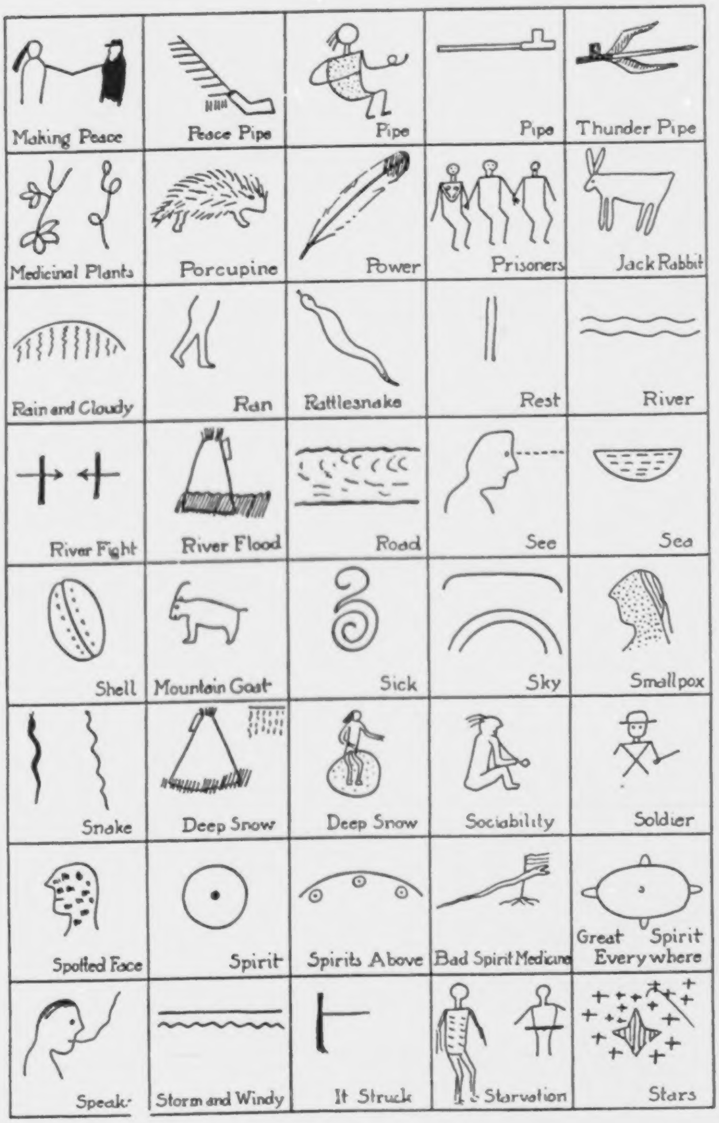
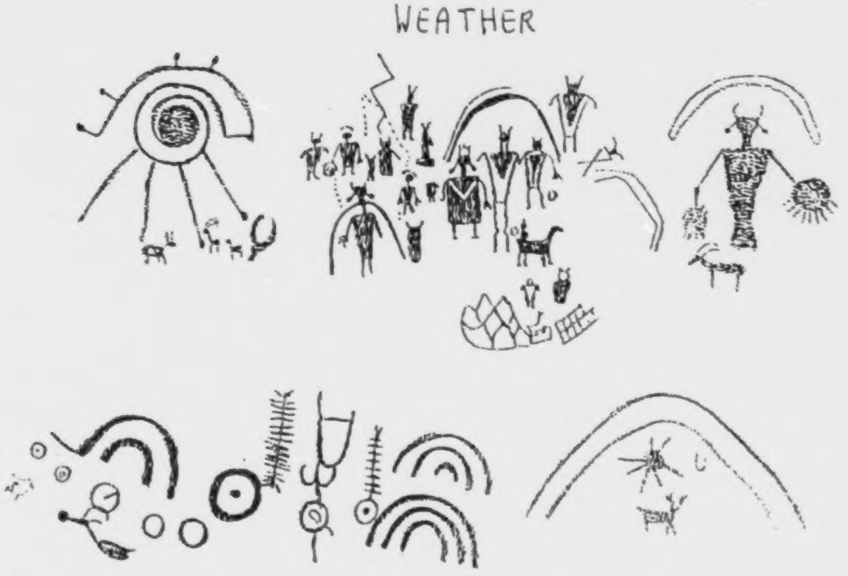

Making Peace
Peace Pipe
Pipe
Pipe
Thunder Pipe
Medicinal Plants
Porcupine
Power
Prisoners
Jack Rabbit
Rain and Cloudy
Ran
Rattlesnake
Rest
River
River Fight
River Flood
Road
See
Sea
Shell
Mountain Goat
Sick
Sky
Smallpox
Snake
Deep Snow
Deep Snow
Sociability
Soldier
Spotted Face
Spirit
Spirits Above
Bad Spirit Medicine
Great Spirit Everywhere
Speak
Storm and Windy
It Struck
Starvation
Stars

Figure 6
"The Weather" (a test tool)



Pictograph of the American indians.

Figure 7
Ofir's Drawing of a Cloud

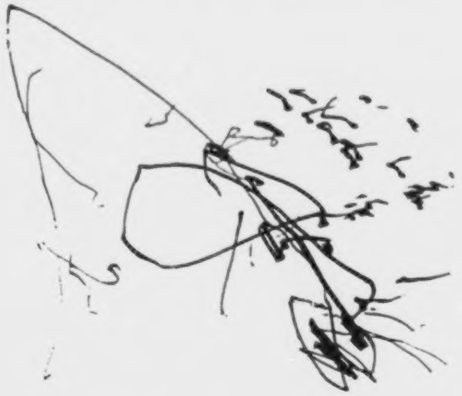
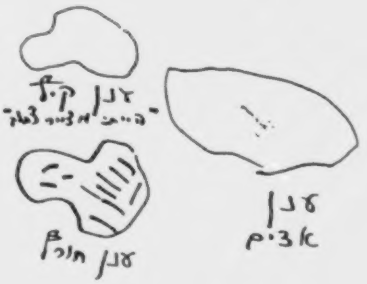


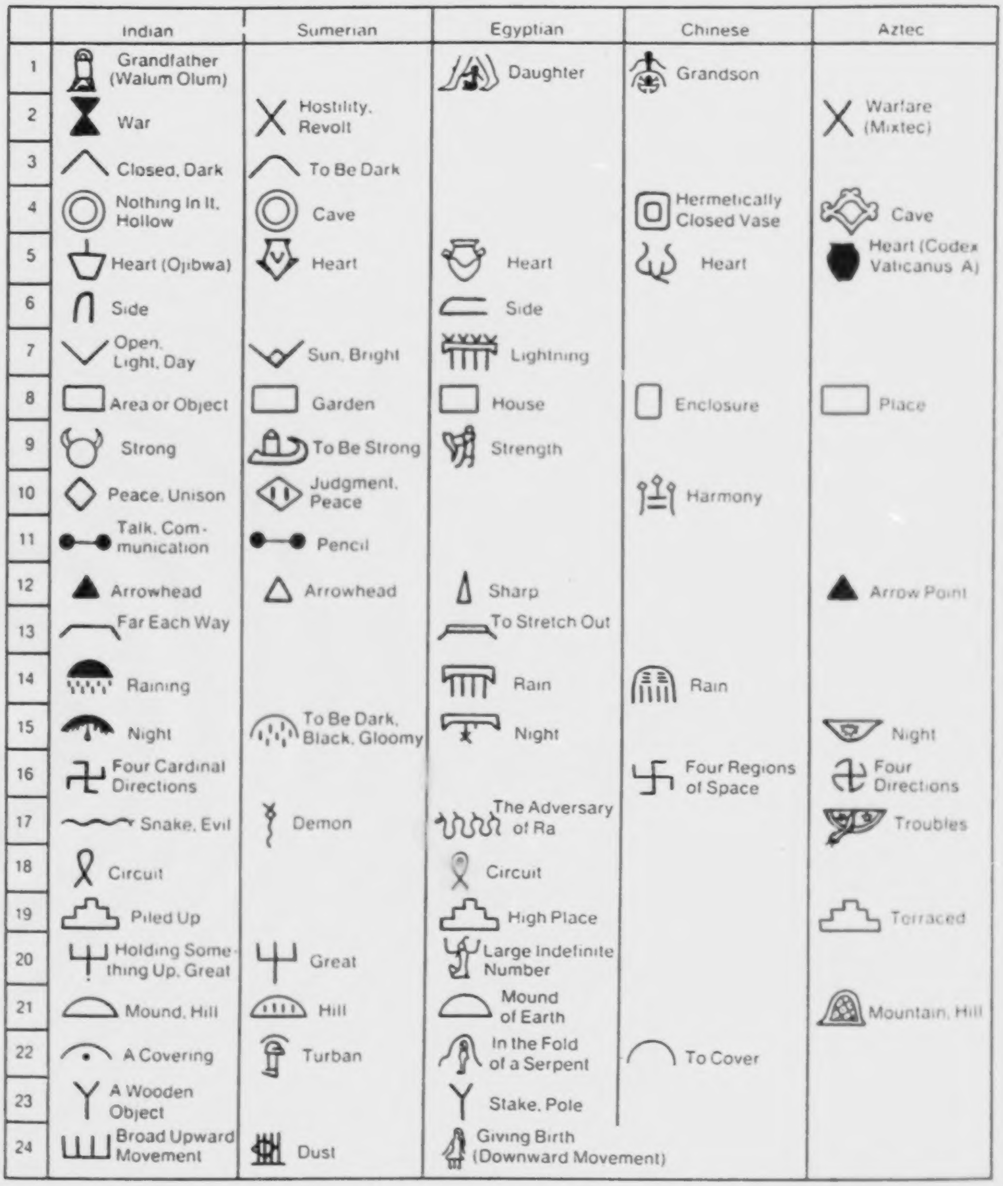
Figure 8
Sagee's Drawing of a Cloud



Discussion

There are many symbols common to all human beings (Fig. 9). Many concepts that are used to make the natural forces comprehensible and are called "scientific concepts" are meaningful and powerful in nature. The sky, earth, sea and the celestial bodies are 'only few examples of natural entities that became archetypal symbols after being gods and the source for myth and legend. The paper shows a small part of the process of a concept formation.

Figure 9
Picture Language in Different Cultures



	Indian	Sumerian	Egyptian	Chinese	Aztec
1	Grandfather (Walum Olum)		Daughter	Grandson	
2	War	Hostility, Revolt			Warfare (Mixtec)
3	Closed, Dark	To Be Dark			
4	Nothing In It, Hollow	Cave		Hermetically Closed Vase	Cave
5	Heart (Ojibwa)	Heart	Heart	Heart	Heart (Codex Vaticanus A)
6	Side		Side		
7	Open, Light, Day	Sun, Bright	Lightning		
8	Area or Object	Garden	House	Enclosure	Place
9	Strong	To Be Strong	Strength		
10	Peace, Unison	Judgment, Peace		Harmony	
11	Talk, Communication	Pencil			
12	Arrowhead	Arrowhead	Sharp		Arrow Point
13	Far Each Way		To Stretch Out		
14	Raining		Rain	Rain	
15	Night	To Be Dark, Black, Gloomy	Night		Night
16	Four Cardinal Directions			Four Regions of Space	Four Directions
17	Snake, Evil	Demon	The Adversary of Ra		Troubles
18	Circuit		Circuit		
19	Piled Up		High Place		Terraced
20	Holding Something Up, Great	Great	Large Indefinite Number		
21	Mound, Hill	Hill	Mound of Earth		Mountain, Hill
22	A Covering	Turban	In the Fold of a Serpent	To Cover	
23	A Wooden Object		Stake, Pole		
24	Broad Upward Movement	Dust	Giving Birth (Downward Movement)		

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The follow-up of Sagee in his creative thinking of "a cloud" gives a strong endorsement to the literature cited in this paper. It indicates that scientific thinking occurs alongside artistic thinking. It makes clear that a child is a very creative human being. It shows that the child build his own metaphors to deal with his conflicts, and at the same time his individual frameworks of the real are formed. The results given here show an idiosyncratic formation of a concept.

Recommendations

The recommendations embodied in the paper are for the purpose of building positive attitudes to modern communication tools in which the imagery components further form, as in the past, an integral part of the learning and interpersonal communication processes.

N. Postman (1982) writes that childhood is a social artifact, and claims that it has come to its end in America. He blames the media for the intensity of the aggression and hyper sexuality in the American society, wishing that the computer would provide the wishful remedy. Israel is also entirely under the influence of the twentieth century technology. The development of media technologies has been perceived as threatening phenomenon by many individuals and various groups. In Israel, most of the writers and poets opposed the new development of media communications. It is most important for all sectors to understand that the new tools are most capable, and are supposed to allow for creativity through new channels, with higher levels of context and intelligence than in the past. Sagee and his friends watch TV and video cassettes. They play computer games. The study group has access to "educational materials", but Sagee's parents are not angels. Omry, Sagee's father, is watching television daily after coming home, for several hours. They live in a small apartment, and naturally, he is exposed to a variety of programs. He has, like every individual, his own priorities.

The author believes that the understanding of the role of imagery in the creativity processes, both scientific and metaphorical, will help in building the right attitudes towards the comeback of picture-language.

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Grave Songs in Stone

by J. Mark Hunter

Abstract

This project's purpose is to record, chronicle, and categorize, and comment upon the visual symbols that adorn the grave stones of the dead. It is an extension of Cochenhour and Rezabek's 1995 study of the observation and classification of sepulchral images. The primary focus is on the Southern United States and the unique images found in Southern graveyards, visual themes which persist through time, and visual themes which have discontinued or emerged over time.

For so thou didst ordain when thou createdst me, saying, "Dust thou art, and unto dust shalt thoreturn." All we go down to the dust, yet even at the grave we make our song: Alleluia, alleluia, alleluia. *BCP*, 1979, 482-483.

Grave Songs in Stone

A survey of graven images which accompany mortal remains yields a fascinating array of symbols. It is established as a peculiar category of visual communication. Nowhere else in modern or recent culture is Everyman lionized in stone. This project's purpose is to record, chronicle, and categorize the visual symbols that adorn the grave stones of the dead and, as we shall see, sometimes the living. This present report is indebted to the pioneering work done by John Cochenour and Landra Rezabek. The pattern of the study has been completely lifted from Drs. Cochenhour and Rezabek. The author is appreciative of their generous sharing of methodology and ideas. Their methods have been used in an intentional effort to parallel their work for possible future collaboration.

This is an examination of some of the graveyards of the Southeastern United States. To date, 25 cemeteries in Tennessee (14), South Carolina (7), North Carolina (2), and Maryland (2) (so it's not a Southern state, at least it was a border state) have been examined and photographed. To date, over 300 symbols have been recorded and categorized into the seven primary divisions established by Cochenhour & Rezabek (1996). These categories are flora, fauna, humanoid forms, shapes/symbols, tools/implements, scenes, and insignia. As with the prior study, many numerous images were subclassified, or cross classified into other categories.

The method of recording the images and information about them was to photograph the symbol with a 35mm SLR and write down certain data. A typical entry would record the place, present date, sex of the person or people being memorialized, dates of birth and death, and the symbols on the stone.

Among the questions that were asked by or emerged during this study are:

- are Southern graveyards different from others studied, if so, how?
- what are visual themes exist through time?
- what visual themes have discontinued or emerged over time?

The author was pleased to discover wide range of symbols that collectively constitute grave songs in stone. Having been taught a love and respect for grave yards as a young man, the author found the tasks involved in this project to be welcome diversions that usually gave a meditative respite to the tasks of the living.

Flora

A frequent use of flowers and trees was observed. Brokenness as a theme showed greater evidence in the 18th and 19th centuries than the 20th. Numerous images of broken rose stems, uprooted willow or oak trees, or the stump of a tree were observed. Figure 1 exhibits a marker of a grave of a man who was a member of the civic organization, "Woodmen of the World". One common memorial metaphor is the healthy tree cut off. The metaphor is of someone in their young adulthood, "cut off in the prime of life."

Figure 1
Woodmen of the World

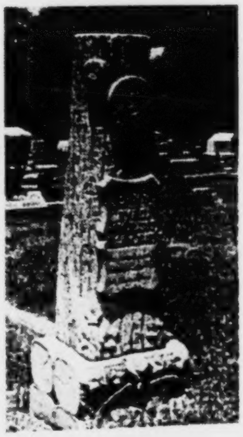

Figure 2. Shows the grave stone of a young woman who died in

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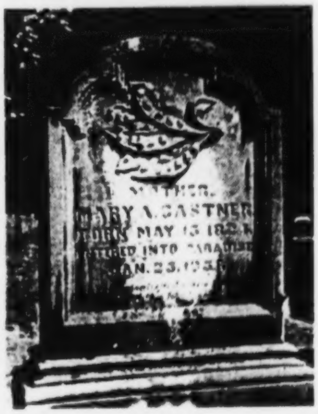
middle Tennessee in 1858. The image is of a cluster of lilies of the valley. By far the more common flower is the Easter Lily. Possible origins for this are that it is a corruption of the Easter morn symbol, or that the lilies of the valley were a favorite of the young lady. This last is suggested because Lilies of the Valley are the flower for May, the birth month of the deceased.

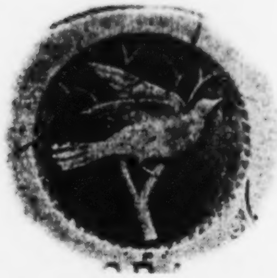
Figure 2
Lilies of the Valley



Fauna

Another common symbol is the dove, here (figure 3.) seen flying from a perch in a tree. The ecclesiastical symbol of the third member of the Christian trinity is the Holy Spirit, usually represented by the dove. However, the dove/Holy Spirit symbol is of the dove either descending, or hovering above a scene. The indication is of the spirit of the individual is leaving the earth and ascending in the form of a dove.

Figure 3
Dove



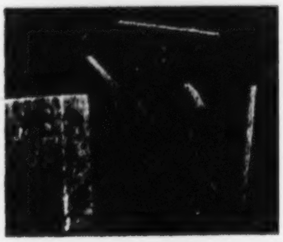
A theme that has emerged in the 20th century is the inclusion of pets on tombstones. Figure 4 not only has the human figure of a boy, but includes the boy's dog as well. This is not a life figure in terms of it representing a likeness of an individual, but rather the romanticized image of a Huck Finnlike childhood remembered. Other images have included domestic cats and other dogs, usually in isolation.

Figure 4
A boy and his dog

Shapes/Symbols

Along with humanoid forms, this is the largest category observed. Among exclusively Southern symbols is the Confederate Memorial marker (figure 5). This cross patee includes the Confederate battle flag in the center surrounded by an olive wreath. The letters C. S. A. (Confederate State of America) are on the outer arms of the cross.

Figure 5
Confederate Veteran Cross Patee

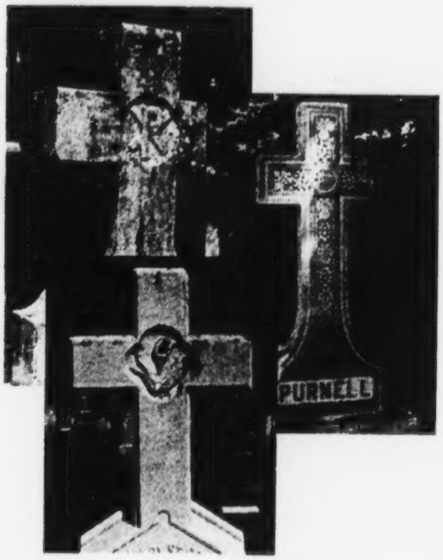


This is the grave of a priest at St.John's Episcopal Church in Berlin, MD (figure 6). The simple stone marker has been adorned with the sea shells. This was reportedly done by a young lady who used to collect them with him. Aside from the deep sentimental meaning of a touching personal remembrance, is the ecclesiastical symbolism. The sea shell is a symbol of baptism – spiritual rebirth. This can be seen a another of the many life symbols which have come to dominate the graves of the 20th century.

Figure 6
Grave stone with shells

The crosses which collectively form figure 7 reflect the prevalence of this symbol, particularly in sectarian graveyards. Of the many forms of this most Christian of symbols, the latin cross is the most simple and common. These examples all include and additional symbol within the context of the Latin cross. 7A contains the XR (Chi Rho), which is the Greek monogram of Christ. 7B contains the Easter Lily, a symbol of rebirth, and 7c contains a theme of grape leaves –symbolic of the Eucharistic feast.

Figure 7 a, b, & c
Latin Crosses
with XP, Easter Lily, & Grapes



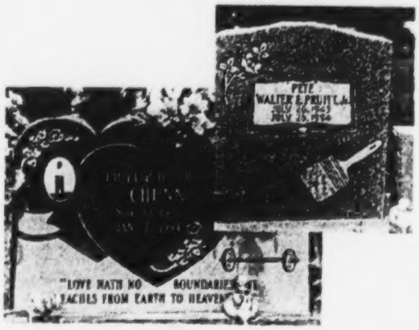
These columns are another representation of the theme of brokenness. The two pictured in Figure 8 are of a set of four found in Rose Hill Cemetery in Columbia, TN. They are the markers of the graves of the four children of this family, all of whom died within two weeks of each other. The column is often employed to depict the life of individuals. Here it is used to memorialize the abrupt end of the lives of children.

Figure 8
Broken columns

Tools/Implements

This is the grave stone of a painter (figure 9a). The simple inclusion of a paint brush is the mark of the tool of the deceased' trade. The grave stone pictured in figure 9b includes a number of images and symbols along with this weight lifter's bar bells. A new kind of sepulchral clipart has come into use. The heart or intertwined hearts are prime examples. They symbolize love. Here the hearts are reflective of the young man's wife and child.

Figure 9 a&b
Bar bells and painter's brush



Scenes

Figure 10 is a scene that includes a number of elements including the "Field and Stream" treatment of animals. A common emergent theme is an outdoors scene form a sportsman's view with game running and fish jumping.

Figure 10
Scene

Insignia

This marker is an example of a sepulchral resume (figure 11). The couple (only one of whom has died) is memorialized along with the individual. This stone attests to the numerous civic organizations, employment (Ford Motors

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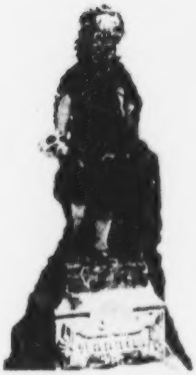
and the railroad), mottos by which to live, and picture of the couple.

Figure 11
Insignia

Humanoid Forms

The humanoid form is prevalent through the last three centuries. As a symbolic visual, it is the most interesting to the author. There are numerous classifications of the humanoid form. The life image, hands, angels, illustrative, and other.

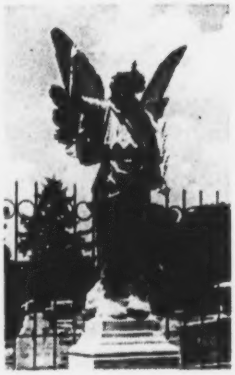
Figure 12
Nannie



Nannie (figure 12) was a four year old who died in the late 19th century. She is buried at the Greenwood cemetery in Clarksville TN. This is a prime representation of the life image of the deceased. The statue is life sized with close detail throughout. It was carved by from Italian marble in Italy.

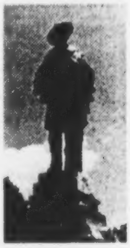
Of particular interest in this memorial is the nature of community involvement when it was stolen in the summer of 1996. A furor ensued with numerous citizens coming forward to offer rewards and other help. The statue was found in the possession of an honest antique dealer in Boston, MA. He took it upon himself to repair the right arm which had been damaged and to drive her the hundreds of miles home to Clarksville. This grave marker returned amid a public reception and acclamation of her return. Grown men were said to have openly wept. *Leaf Chronicle*

Figure 13
Look Homeward Angel



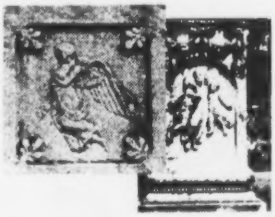
This angel (figure 13), marking the grave of a woman who was buried in the Hendersonville, NC public graveyard, also took on a meaning that transcended the life of the person being memorialized. This is the angel that Thomas Wolfe wrote about in his novel, *Look Homeward Angel*, (19xx). This humanoid figure stands on a 4' pedestal and stretches over 12 feet in the air.

Figure 14
Confederate memorial



The Confederate Memorial is ubiquitous across the South. This example (figure 14) appears as a grave memorial. The figure is a likeness of the soldier. Note the rifle being held has its barrel in the ground. An attitude of resignation from conflict.

Angels have been a theme since the beginning of New World cemeteries. In the first of these two examples (figures 14 a&b) is a Victorian treatment of angelic ascension to heaven. The fig 14 b is the grave of three children of a family. The deaths were within two years of each other.



Another treatment in the burial of a child is this stone from Old Zion Presbyterian Church in Columbia, TN (figure 15). This photograph was taken from above. The image is that of a child asleep on a pillow. The pillow tops a three foot high slab stone which identifies the child and her parents.

Figures 16 a&b are a common motif of clasped hands. These symbolic gestures depict various meanings. Frequently, it is symbolic of a hand shake with God. A hello to heaven. Figure 16a represents a parting. The legend reads, "farewell", and the hands may be that of a woman and a man.

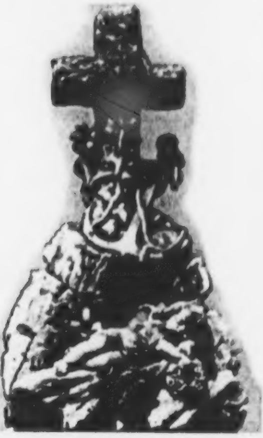
Figures 16 a&b
Clasped hands

The other hand shake example is atop the grave of a Mason. The Masonic symbol appears below the hands and careful inspection reveals the stylized handshake of the Masons.

Combinations and Other

This is a charming example of Victorian excess (figure 17). Among the symbols present are: a cross made of timbers, ivy (everlasting life), easter lilies (rebirth), an anchor (hope), the rugged rock (salvation), a sleeping cherub (asleep in death), and a wreath of roses (symbolic of death and rebirth).

Figure 17
Victorian Baroque

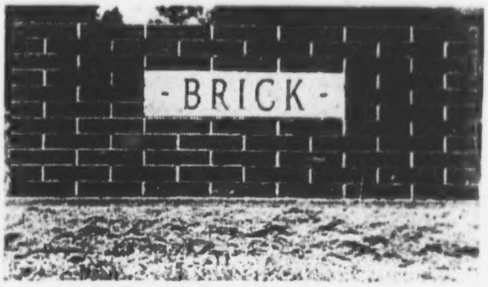


The final sub category is *humor*. Rare is the tombstone that reflects levity or humor. Graveyards are usually marked by tranquility, meditation, seriousness, and mourning, even among the newer themes of renewal of life amidst death. One young man's stone contained the quoted epitaph, "In a second – maybe later." An allusion to someone habitually late? Perhaps even someone late to his own funeral. A striking example of visual punning is found in the stone which memorializes the life of Meyer Brick, a citizen of Clarksville, TN (figure 18). Red granite is used in the manufacture of the stone. It is scored to depict a stack of bricks and stands out among the monochromatic grey of Greenwood Cemetery, Clarksville, TN.

Themes

The themes found peculiar to Southern graveyards are mostly associated with the Confederacy. While there are a very few individuals who continue the confederate theme today, it is one that represents a glimpse of history rather than a continuance. Another theme which has been apparent form the past three centuries is the depiction of a life image of the deceased. In the 17th and 18th centuries, this practice was restricted by cost of manufacture. Today there are a number of relatively inexpensive methods of life depiction. Among them are photo enamel portraits, and laser etching from digitized images.

Figure 18
Humor



Areas of further study might include:

- what symbols are understood today?
- how is technology affecting the creation of tombstones
- what are the methods of construction?
- continued thematic inquiry

One carves into stone that which is to remain as an (ever)lasting message. even so I am reminded of Donne's imagery that lives even longer. The poet and priest John Donne spoke about death in one of his sermons:

It comes equally to us all, and makes us all equal when it comes. The ashes of an Oak in the

Chimney, are no epitaph of that Oak, to tell me how high or large that was; it tells me not what flocks it sheltered while it stood, not what men it hurt when it fell. …And when a whirlwind hath blown the dust of the Churchyard into the Church, and the man sweeps out the dust of the Church into the Churchyard, who will undertake to shift those dusts again, and to pronounce, This is the Patrician, this is the noble flower, and this the yeomanly, this the Plebeian bran.

John Donne,
LXXX Sermons, Christmas Day, 1627.

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Mitre and Staff

Visual Design Principles Applied To World Wide Web Construction

by Donald D. Luck
and J. Mark Hunter

Abstract

The purpose of the article is to describe three basic types of web pages and begin to create guides for page layout design based on principles consistent with principles of visual literacy. Problems and solutions in web page construction are explored with these principles in mind.

Visual Design and the Web

The World Wide Web (WWW) has opened a new horizon for would be publishers of information in digital form. Until now, the power of the press was available to those who owned a press. Today, the power to communicate with millions of people is in the grasp of anyone who has a computer, the knowledge to create a web page, and the $20-$30 per month to maintain a connection to the Internet. One writer claims a new web page is added every 30 seconds (Descy, 1996). Given proliferation of web sites and wide spread access to the medium, a general lack of attention to the visual design elements of this medium is apparent. Many developers of WWW sites have little or no fundamental understanding of the elements or importance of visual design.

This paper has two purposes: 1) establish categories of web pages and 2) establish design criteria for these types of pages based on sound visual design principles. The intent is to help a WWW designer create a site that is not only rich in content, but is visually and aesthetically accessible to the user.

Heinich, Molenda, Russell, and Smaldino (1995) state the primary goals of visual design, those being to:

- ensure legibility;
- reduce the effort required to interpret the message;
- increase the viewer's active engagement with the message;
- focus attention on the most important parts of the message.

How this is accomplished varies based on the type or purpose of web page being designed.

What Medium?

The categorization of the WWW and the graphical face of the Internet is open to some debate. Is it a projected visual? Non projected? Is the interface just another type of multi-media? The primary, though not sole use of the WWW, is to display static images on a color cathode ray tube (CRT). Like applications of television and other projected visuals, some WWW pages are colorful and have a squarish aspect ratio (4:5) which varies among end users. Like print media, some WWW pages are text rich displays, but unlike print media the end user has a great deal of control over the final look of the document.

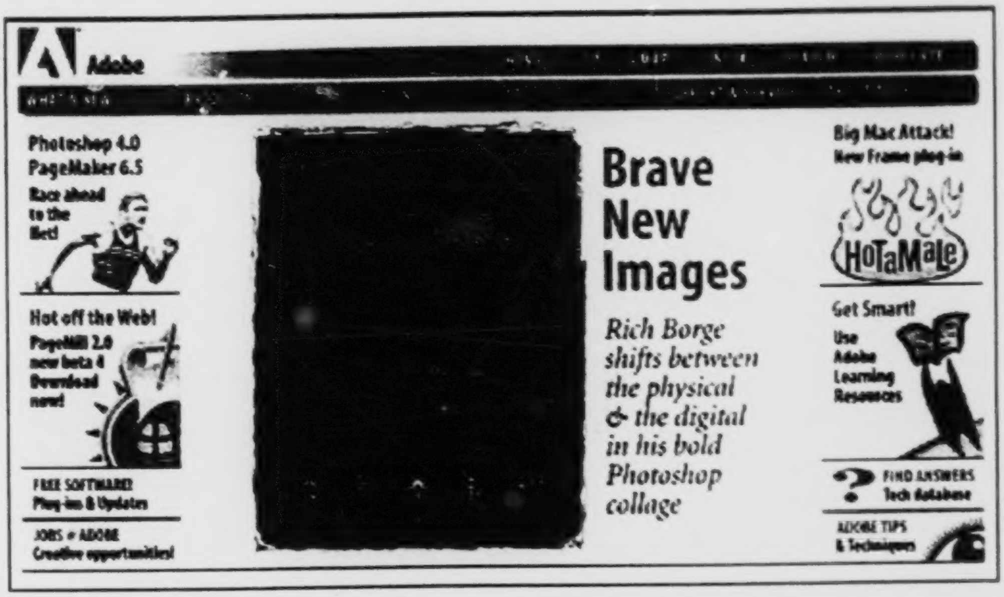
The result is a media combining aspects of projected and non-projected visuals, a media where the author relinquishes many of the format controls over the final document found in other forms of media. Which rules of design apply to which pages is based primarily on the purpose of the page. The remainder of this article establishes a set of categories for pages and parts of pages that are used for the basis for design rules.

Types of Pages

Billboard

Billboard pages are the opening page of any location or related group of pages. Good Billboards accomplish two interrelated tasks. The first is to get the users attention so they stop and examine the page. With over six million documents available on the web it is important that the initial page grab the user's interest either by being aesthetically interesting or indicating the information the user desires is available at the site. Second is to provide a beginning point where the user can find more information. Pages should not be looked at in isolation. The Billboard page should initiate a continuing graphic theme seen throughout the related pages. The most important requirements for a good Billboard page are aesthetic appeal, clarity of content and purpose, and ease of access to linked information.

Figure 1
THE ADOBE HOME PAGE
HTTP://WWW.ADOBE.COM


Adobe
Photoshop 4.0
PageMaker 6.5
Race ahead to the Net!
Hot off the Web!
PageMill 2.0 new beta 4 Download now!
FREE SOFTWARE!
Plug-ins & Updates
JOBS @ ADOBE
Creative opportunities!
Brave New Images
Big Mac Attack!
New Frame plug-in
HoTaMaLe
Get Smart!
Use Adobe Learning Resources
FIND ANSWERS
Tech database
ADOBE TIPS
& Techniques

Rich Borge shifts between the physical & the digital in his bold Photoshop collage

Aesthetic appeal can be achieved through use of color, pattern, and arrangement of visual elements and by appealing use of text. Colors and organization should draw attention without overpowering the message of the page. The pattern established by this opening page should continue throughout all related pages. Billboard layouts should include the principles of good graphic design including balance, alignment, shape, style, color scheme and color appeal. When designing Billboard pages one should follow rules and principles for design of projected visuals.

The Adobe page in Figure 1 illustrates good Billboard design. When seen on a color monitor has dramatic color that both draws attention to the various parts of the page and is aesthetically appealing. Objects are aligned creating a pattern which the users eye can follow and allows the user to easily make sense out of what they are seeing. Objects are defined by the vertical columns and by horizontal breaks. The page grabs your attention, defines what is there, and provides easy access to the divisions at the site.

Directory/Index

Directory and index pages provide a means to easily find information at a web site or to move from information to information. Some sites are exclusively indexes while others use an index to send users to the appropriate location within the site. Whichever, the primary purpose of a Directory/Index page is reducing the effort required by the user to find information. Directory/Index pages should be as straight forward as possible. Clarity and organization are key. These can be achieved by careful attention to using a consistent, appropriate organizational scheme throughout the index.

To alleviate long scrolling lists many directories use a multi-column format. Columns place more information on a page. When columns are used one must be aware of vertical and horizontal white space. Space is needed to separate both the columns and the entries in the columns to produce a useable document.

Indexes should provide easy access to the most chosen sites. This can be accomplished by use of either a most often chosen list or placing the most popular under the classification heading at the root level.

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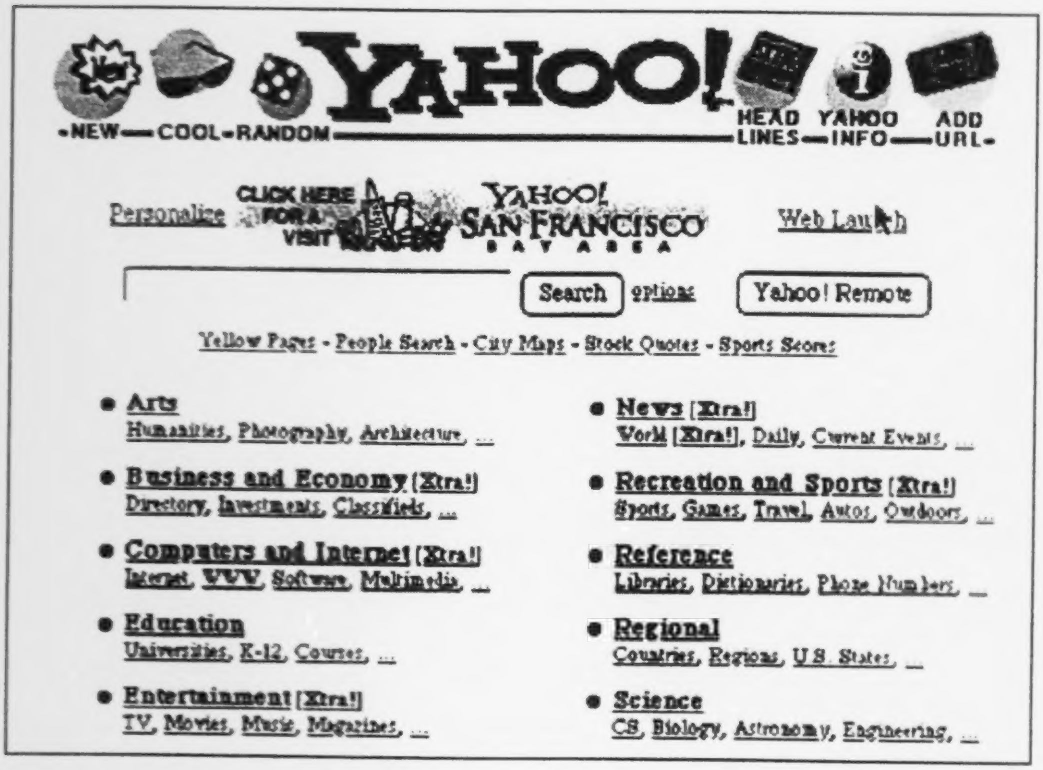
Figure 2
YAHOO DIRECTORY
HTTP://WWW.YAHOO.COM



Yellow Pages - People Search - City Maps - Stock Quotes - Sports Scores

- **Arts**
  Humanities, Photography, Architecture, ...
- **Business and Economy** [Xtra!]
  Directory, Investments, Classifieds, ...
- **Computers and Internet** [Xtra!]
  Internet, WWW, Software, Multimedia, ...
- **Education**
  Universities, K-12, Courses, ...
- **Entertainment** [Xtra!]
  TV, Movies, Music, Magazines, ...
- **News** [Xtra!]
  World [Xtra!], Daily, Current Events, ...
- **Recreation and Sports** [Xtra!]
  Sports, Games, Travel, Autos, Outdoors, ...
- **Reference**
  Libraries, Dictionaries, Phone Numbers, ...
- **Regional**
  Countries, Regions, U.S. States, ...
- **Science**
  CS, Biology, Astronomy, Engineering, ...

The page example above from Yahoo illustrates good directory design. The directory is broken into two columns providing more information without scrolling. Major headings are logical and the most often used sub-directories are available on the main page. The page also provides and easily accessible search capability.

Text

Textual pages provide information in written form. Text and graphic are often the heart of a web site providing the meat for which the user is searching. Although no research could be found, it is reasonable to assume most extended text pages are printed for reading. Textual pages should therefore follow as closely to good print rules as possible keeping in mind the limitations of the media. Rules for textual pages would include number of words per line, indentation, and justification. The indent, a basic rule of text, is nonexistent in HTML code. The most common means of producing an indent is through the use of a clear GIF graphic occupying a ten to fifteen point horizontal space.

Graphics

Like text pages, pages that provide information graphically are often the reason users are at a web site. Care should be taken to insure graphics on your pages follow as close as possible to the same rules that govern placing the graphics in printed form. Special care must be taken to insure the graphic is compressed using the correct compression algorithm. Good graphics becomes a compromise between the quality of the graphic and its size. Quality graphics add to the aesthetics of a page but long downloads reduce the usability of a page.

An important use of graphics is for use as an index through a process called image mapping. Areas on an image are identified as "hot spots" or links by the author.

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Clicking on these hot spots transfers the user to another location in the same way clicking on hot text transfers the user. The Adobe home page in the first illustration shows the use of an image-map.

Input

A unique feature of web pages is their ability to allow input from the user. Often the sole purpose of the page is to allow the user to provide input in some form. Clarity and ease of use are primary requirements for such pages. It should be clear not only what type of information is needed, but also how that information can be entered and sent by the user.

Multi-Purpose

While the following illustrate three of the most common purposes of web pages and suggestions for a resulting style, these do not describe all the types of pages. The most common type of page may well be a combination of two or all three of the defined types. In these cases, styles appropriate to the purpose should be applied to that part of the page.

Problems in Authoring

The biggest problems facing web page designers are lack of common page layout tags, variability in the forms of HyperText Markup Language, and variability in equipment. HyperText Markup Language, the language of web pages, does not contain standard commands for setting parameters easily established in text. When one "lays out" a page in HTML one cannot be certain of the width and therefore length of the document, the size or style of font, or even the type face. Most browsers allow the individual to use standard settings for font and size but these settings can be easily changed in the two most often used browsers to meet the needs or aesthetic temperament of the user. Such standards are being introduced by the two largest browser manufacturers but haven't yet been adopted by all browser manufacturers or approved by Internet Engineering Task Force (IETF), the organization that oversees the "official" HTML code.

Although all browsing software recognizes a standard set of commands or tags, some browsers do not recognize the command set of "extras" created for competing browsers. A magnificent effect on one browser can become a muddied hodgepodge of lines on another. Some browsers are incapable of showing graphics at all. If a directory is based solely on allowing the user to "click on" parts of a graphic for navigation and the user's browser cannot show graphics the page is wasted.

Size differences in user's monitors as well as the type of computer or monitor being used adds another variable. A graphic which fits well on a fifteen-inch monitor needs to be scrolled on a thirteen-inch losing the aesthetic input of the graphic. Different computers also portray color palettes in different ways. For example, a graphic designed on a Macintosh using the standard palette may appear darker or muddied when shown on an MS-DOS based machine.

Solutions

Layout/text

Web pages follow the rules of design for projected visuals in some cases, non-projected in others. When pages are meant to capture the attention of the user rules for projected visuals are appropriate. Rules for non-projected visuals or text should be followed as closely as possible when designing pages that provide information. Common rules of text are difficult to enforce. Although lengths of text per line should remain between 50 to 70 characters (Arntson, 1993) this is nearly impossible to enforce when users are able to set their own font size and face, and width of page. There are ways to bypass these text layout problems.

It is possible to turn all text to graphics. This gives the author absolute control over common text formats but requires the author to make a separate page for people without graphic browsers. It also increases the download time, complicates printing, and adds to the authoring process. In addition, the author must establish all links through an image map rather than the much easier and more universally used text link. Authors can place web pages in Adobe Acrobat format or other cross-platform readable format. This insures layout integrity but requires the user to have additional software that while free requires downloading and setup and additional memory overhead.

Some web authors provide guides on text documents suggesting the font face, size, and width of page to be used. Others may try pre-formatting the text. The new browsers by Netscape and Microsoft allow the user to set font face, and font size relative to the base size established by the user in their browser setting. This produces typographical effects closer to those achieved in print but still does not control for width of page or base font size. These tags work only on the specific browsers mentioned and the text appears the default standards for other browsers.

Whenever marking up text it is best to use logical rather than physical styles. Logical styles refer to markups such as "strong" or "citation." Each browser is capable of showing these styles in some manner. All browswer can not show logical markups such as "italics" or "bold." The use of italics is discouraged as it is illegible at the default size of most browsers.

Graphics

When including graphics in a page authors should always remember to include alternate text for those who do not have access to a graphical browser. Graphics on the web use two formats, GIF and JPEG. GIF should be used for graphics with large sections of solid color. JPEG should be used with graphics with subtle changes in color or transitions from color to color. Use of the wrong format can result in larger files or banding. When using GIF files experiment with decreasing the color palette. Web graphics are a balance between size and picture quality. Remember there may be people downloading that beautiful 250K picture using a 2400 Baud Modem.

Also, remember to downsize your pictures to insure the picture will fit the user's monitor. Most browsers use some space with command buttons, sliders, or information palettes. Having to scroll to see an entire picture destroys the aesthetic value of a picture. Often it is better to use thumbnails or small pictures that can be clicked to load the entire large picture if the user chooses.

Color palettes differ among computers. Colors can be improved by creating images using the color palette of a specific browser. The graphics will be adequate on any browser and look spectacular on the browser for which they were designed.

One concern for web authors is insuring hot spots on image-maps are identifiable. Most browsers provide a visual clue by changing the cursor from arrow to browsing finger when passing over a hot spot but many users are unaware of this change and other visual clues are necessary to inform the user of the hot spot. These visual clues could include text stating the image is linked to other pages, text, or animations. Always include a textual index on the page for those without graphic browsers.

Testing the Page

The first step in checking a page should be validation. Validation checks your pages for nonstandard tags, misapplied tags, or improper syntax. Various services such as those at the WebTechs location at HTTP://www.webtechs.com/html-val-svc/ exist which will validate your pages over the web. Before publishing a page it is always wise to view the page in many browsers both graphic and text based. By trying your page in different browsers you can see what problem may happen for your users and alleviate them before the page is made public.

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Vertical Hegelianism And Beyond: Digital Cinema Editing

by Roger B. Wyatt

Abstract

The dynamic interaction of new paradigmatic frameworks with digital tools and techniques has reinvented Sergie Eisenstein's conception of vertical montage. The tight synchronization of multiple tracks is replaced by an organic process of image layering creating new meaning.

Hegelian Cinema

Cinema as an art and communication form is entering its second century of development. From an editing perspective, the work in particular of Griffith, Eisenstein, and Hitchcock elevated cinematic editing from mere narrative assembly to Hegelian juxtaposition of image and sound sequences, creating new meaning in the process. Sergei Eisenstein, the most formally theoretical of these filmmakers, conceived of editing in horizontal and vertical terms. The shots of a horizontally edited sequence occupy the same screen space at different times. Chronologically sequential edit patterns are created. Horizontal editing is the linear assemblage of shots to form sequences that unfold over time.

The Hegelian construct of thesis in collision with antithesis that yields a new synthesis is at the heart of Sergei Eisenstein's editing theories. Cinematically, Hegel would be expressed as shot one plus shot two equals idea three. Eisenstein stated that, "montage is an idea that arises from the collision of independent shots-shots even opposite to one another ...." (Eisenstein, 1949, p. 49)

Eisenstinian collision of images yielding new meaning is one of the most powerful techniques that filmmakers use. The creation of meaning through gaze is based on this technique. An editor selects a shot, perhaps a close-up, of someone looking. Joined by a cut, the next shot reveals what is seen. It is the juxtaposition of the two shots, linked by a cut, in the mind of the viewer that creates the observer observed relationship. There is nothing inherent in either of the two shots alone that contains the resulting idea.

V.I. Pudovkin's and Lev Kuleshov's experiments with shot juxtaposition explored this relationship. Pudovkin reported that, "Kuleshov and I made an interesting experiment. We took from some film or other several close-ups of the well-known Russian actor Mosjukhin. We chose close-ups which were static and which did not express any feeling at all- quiet close-ups. We joined these close-ups, which were all similar, with other bits of film in three different combinations. In the first combination, the close-up of Mosjukhin was immediately followed by a shot of a plate of soup standing on a table. It was obvious and certain that Mosjukhin was looking at this soup. In the second combination, the face of Mosjukhin was joined to shots showing a coffin in which lay a dead woman. In the third, the close-up was followed by a shot of a little girl playing with a funny toy bear. When we showed the three combinations to an audience, which had not been let into the secret the result was terrific. The public raved about the acting of the artist. They pointed out the heavy pensiveness of his mood over the forgotten soup, were touched and moved by the deep sorrow with which he looked on the dead woman, and admired the light, happy smile with which he surveyed the girl at play. But we knew that in all three cases the face was exactly the same." (Pudovkin, 1929, p. 168) The linear assemblage of shots constructs meaning in horizontal editing.

Eisenstein conceived of vertical editing patterns primarily as the synchronization of simultaneous image and sound elements, particularly music, to create cinematic meaning by means of the relationship between them. The orchestral score with its many staffs filled with intricate, but synchronized notation, was Eisenstein's inspiration for vertical montage. He observed that, "... this new kind of montage, associated with this film, I have named: vertical montage.... Everyone is familiar with the appearance of an orchestral score. There are several staffs, each containing the part for one instrument or a group of like instruments. Each part is developed horizontally. But the vertical structure plays no less important a role, interrelating as it does all the elements of the orchestra within each given unit of time. Through the progression of the vertical line, pervading the entire orchestra, and interwoven horizontally, the intricate harmonic musical movement of the whole orchestra moves forward" (Eisenstein, 1947, p. 74). He goes on to say that, "when we turn from this image of the orchestral score to that of the audio-visual score, we find it necessary to add a new part to the instrumental parts: this new part is a "staff" of visuals, succeeding each other and corresponding, according to their own laws, with the movement of the music-and *vice versa*" (Eisenstein, 1947, p. 74).

Paradigms, Technology, and Cinema

The Eisensteinian editing theories and techniques embody the values of the dominant paradigm of the time. They were grounded in a linear, assembled, progressive, and fixed worldview of the positivist paradigm of the industrial era. In the context of moving image editing, these ideas have stood without much extension for well over fifty years. In recent years, both paradigm and technology have changed. Both developments are affecting all elements of the theory base of moving images.

At the paradigmatic level, emergent systems theory derived from biology and ecological consciousness, posits a worldview of interdependent systems that are self-organizing, self-renewing, and self-transcending. (Capra, 1982 p. 269, Kelly, 1995)

At the technological level, the rise of cybernetic and electronic technologies, the softmachines of both Jim Morrison and John Von Neumann, replete with computers and networks, now dominate the technological landscape. Both the paradigm and the technology are locked in an intimate spiral of mutual definition. The new machines are as much result of the new worldview as conversely the new worldview is a creation of the new machines. From a systems perspective, a technological system is composed of four interactive elements: hardware, software, thoughtware, and context. It is a human surround that provides the system context.

The impact of these profound changes is only beginning to be felt within the domain of cinematic theory and practice.

The cinematic technology revolution of the last decade along with the revisioning of the theory base has led to a reconceptualization of vertical editing. Computer utilization and non-linear editing technique facilitate a new form of juxtaposition of meaning. This is accomplished by the digital overlay and underlay of multiple images. Under cybernetic conditions vertical editing becomes multiple images layered in space and simultaneous in time, rather than synchronized juxtapositions of strips of sound and image. Examples of the new context of vertical editing can be found within music videos, commercials, and the works of the avant garde.

For decades layered images have been created with the analog technology of the film optical printer. However, optical printing is not even remotely similar to working with digital technology. The dynamics of creative digital technology work are very different. Optical technology requires a planned and rigid sequence of steps to be taken in a specific order. The results cannot be seen or revised in realtime. The film must be developed first. In a planned process such as this, there is little room, if any, for spontaneity. The techniques of this technology, informed by an industrial age paradigm, demand a precise and planned approach from which there can be no deviation.

The electric analog video process of chromakey extends the process. Chromakey is a video technique that electronically eliminates a specified color, usually the background of a shot and its replacement with another image. While more fluid than the optical printer, chromakey does not allow for the techniques of selective replacement and the near infinite layering of multiple images, with no degradation of resolution, that a digital approach allows. A digital approach utilizing digitized images reworked in software facilitates the painterly approach of the artist.

The techniques of digital technology are informed by emergent systems thinking. Accordingly self-organizing, self-renewing, and self-trancending elements are present. In a digital environment, results are viewed and revised in realtime. Very often, the spontaneous juxtaposition of layers leads to the creation of new meaning. Within the digital frame immediate feedback and revision facilitate self-organized meaning that is emergent from the process. As the ease of revision facilitates multiple and alternate juxtapositions, digital editing becomes self-renewing, always reinventing the sequence. Because the layering of imagery creates new meaning, vertical editing becomes a self-trancending process. The layering of unrelated images creates unexpected juxtapositions that yield new meanings.

Digital Vertical Montage

The author's work of Digital Cinema, **The Songs of Steel**, contains many examples of these processes. One wide angle long shot contained a view of Titus and Talifer, two principle characters, warily advancing towards the camera. The original video image, with a stage as background, lacked the context that the story required. In a film or video context, this shot would be for all intents and purposes unusable. In analog media, image elements are locked into a fixed relationship with other image elements.

Digital information is highly fluid. It can easily take on new forms. The ease with which fonts are changed in a text file serves as an example. Because a digital image is not fixed it can be revised at any time. By underlaying a forest grove behind the two characters, a new context was created. The original image had been reinvented. Fluid digital images invite restructuring. They are self-renewing.

The process was by no means complete. The underlayed image was now overlayed with the image of a vine in the foreground that was eventually pulled aside by an unidentified hand entering the frame. This new image emerged out of the process of vertical editing not from any specification called for in the script. Digital editing is self-organizing.

The resulting three layer shot is very different from what was described in the script. The script has predicted nothing. Its importance lies in providing an initial condition for development. Where the original long shot presented an objective and neutral view of the two characters. New meaning was created by the overlay of a hand entering the frame and removing the vine. The long shot, no longer objective, was now the perspective of an unknown viewer. It is solely the juxtaposition of images that has created the new viewer realization. By fusing disparate images, the new combined image is self-transcendant containing new meaning that is not to be found in the separate image elements.

The Eisensteinian notion of vertical editing has been restructured. No longer does the term solely refer to the symphonic synchronization of visual elements with soundtrack elements. Informed by a systems view, implemented by digital tools and techniques, vertical editing has acquired new meaning. Vertical montage now creates virtual environments. As a result, new and innovative forms of cinematic expression and meaning are emerging. Vertical editing is a key element in establishing a painterly cinema. The crisp construction of Hegelian meaning is giving way to the more elliptical and emergent meaning of layered digital imagery.

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Digital Cinema Principles and Techniques for Multi-Media Development

by Dr. Roger B. Wyatt

Abstract

Digital Cinema is a theoretical construct for understanding moving images produced and viewed in a digital context. The shift in perspective that emanates from the models' view leads to fundimental change in the production process of moving images. An introductory examination of thoses changes is the focus of this paper.

Paradigms and Models

The Songs of Steel is a work of Digital Cinema. It contains an original story that unfolds in the Fifth Century A.D., the time of the fall of the Roman Empire. The work is concerned with perceptions of paradiagmatic shift observed in the context of change. **The Songs of Steel** is linked to the continuity of motion picture development by the utilization of many film noir conventions. These include identiy shift, a romantic triangle, and betreyal among conspiritors. Perhaps **The Songs of Steel** is an example of a new film genre, Roman Noir.

Where the work diverges from the continuity of motion picture development is in its digital aspects. **The Songs of Steel** can be described as an abstract motion painting. While abstract conditions don't solely depend on a digital state, these specific images could only emerge from a digital context. With intensive utilization of computer visualization techniques that range from the exotic morphing to the mundane cut and paste, **The Songs of Steel** is highly abstract in appearance. Digital tools, processes, and a digital conceptual view are necessary conditions for development of this project.

Nineteen ninety five is an appropriate year to examine issues arising from the production of moving images. This year marks the centennial of the birth of film. On December 28, 1895, at a cafe in Paris, the Lumiaire Brothers organized the first public screening of a motion picture.Thus cinema has completed its first century and is now embarked upon its second.This second century appears to be a digital one.

Digital electronic technology systems are composed of a quartet of elements: hardware, software, thoughtware, and their context. In this model, hardware is seen as the physical appratus itself. As such, it is the most tangible element in the model. The software element of the model represents application programs, operating systems, and other programs. They are composed of thousands or perhaps millions of lines of coded instructions. When run, they transform hardware from an inert and purposless box crammed with electronics into useful and productive technology. Within software, hardware finds both purpose and identity. Thoughtware is the model component concerned with the techniques of technology. These are the combination of skills, views, values, and techniques that the user brings to bear when undertaking productivity tasks with digital technology. Context is the human surround or environment that enfolds all technology. Organizational values, emotions, history, desires, and fears all combine to create a dynamic interaction with both user and technology.

The four elements of the model are in a mutual casual relationship with eachother. A mutually causal relationship is a context sensitive relationship where to alter one element in the relationship is to change them all. For example, an advance in hardware capacity, such as a faster cpu (Central Processing Unit) opens new possibilities for software applications. Mutually causal.

Paradigms are the most fundimental thoughtware elements in the Digital Systems Technology Model. Thomas Kuhn, in his book, **The Structure of Scientific Revolutions**, (Kuhn, 1962) reveals the crucial importance of conceptual frameworks within disciplines and the process of change that leads to the replacement of one paradigm by another. Contemporary society is undergoing a paradigm shift. Changes in worldview of this magnitude decenter everything, including moving image production.

Contemporary global culture is evolving from a mechanistic worldview of an age of industry into an emergent systems model of an age of information. Fundamental values and assumptions are starting to shift. The new framework emerges from new understandings derived from systems theory and biology (Capra, 1983, Kelly, 1995). Emergent systems are self-organizing, self-maintaining, self-renewing, self-transcending.

A digital production system for a digital cinema emerges from this theoretical context. Such a system is emergent and not fixed. A digital production reflects a shift from a positivist, logical, and sequential world of crisp logic to an indeterminant, nonlinear, and world of fuzzy logic. These values inform, shape, and surround the production process of digital cinema.

The Digital Cinema production system is located within a Technology Quintet composed of video, computers, mass storage devices, telecommunications, and audio. These technology groups develop in two ways. First there is the linear developmet of technologies within the group. The development of 286, 386, 486, Pentium in the Intel CPU series serves as an example. This form of development is usually sequential and progressive, though on occasion these evolutions are punctuated by revolutions. The second form of development that occurs is the merged interactions among technology groups to form hybrid technologies. An online database requires both telecommunications and computing technology in order to to be implemented. Merged technology development often occurs as the result of non-linear, suprising jumps. Wireless email or a video dialtone are the results of this non-linear form of development. Desktop video technology is the result of the fusing of computer and video hardware.

Three Phases of Change

Digital moving image production systems are the result of a three phase technology restructuring process. In the first phase new technology enhances existing tasks and processes. It makes them better, faster, cheaper, or easier. At this stage what these terms actually mean is unclear.

The author's own attraction to computing serves as an example of a phase one situtation. At the end of the seventies, the author had been an active filmmaker for ten years. In an independent film production context of that period, the most trying stage of the process was the production of titles. Producing white text on a black background was a time consuming task demanding precise execution of many component subtasks. Failure at any stage would doom the entire effort, necessitating starting over from the beginning. High contrast Kodalith film demands precise exposure or the image will contain muddy whites and grayish blacks. Slightly soft focus is unacceptable when presenting text. In a pre-spell check environment a misspelled word renders a credit screen unuseable regardless of correctness of exposure or rightness of focus. Title production created an environment of demanding complexity.

However, change was at hand. The author's first exposure to a microcomputer came when leafing through a magazine in Polks Models, a hobbyist store in New York City. The magazine contained an advertisement for a microcomputer. Unaware of computing, the author was attracted by the display of electronic text on a computer screen. The author realized that titles composed of electronic text could be filmed off the monitor. A new technology would facilitate title production in a mode that was better, faster, and cheaper than

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working with 16mm Kodalith film. This insight was a phase one realization focusing on improvement of an existing sequence of tasks in the context of the existing process.

Phase two is an integrative stage. In an integrative stage of the model, processes are still viewed in the context of the old, but are starting to shift in new directions. At this point, a technological integration of multiple changed tasks into an integrated whole occurs. Individual tasks are redefined as sequential hierarchies of process are flattened and joined. As a result of new technology innovation, the task of creating a white text on a black background title screen became a trivial one. The multiple tasks of insuring that Letraset paste-on letters are properly aligned, title card making, card alignment, card lighting, exposure, focus, and film development, all crucial to the earlier film process, are either eliminated or compressed. Title production is now done in one place by one person at one time on the computer desktop. Individuals and small groups are empowered.

At the third phase, technological reconceptialization not only alters the tasks and the processes, but the rational and the outcomes of the process as well. Not only how, but why is redefined. Both traditional goals as well as problems encountered while achieving them become irrelevant.

The third phase of technological restructuring is informed by the nature of problems.There are three classes of problems: problems solved, problems not solved, and problems that go away. In the third phase of technological restructuring, many process problems are rendered irrelivant. Whether anyone, let alone the author, can position Letraset letters in straight and parallel lines no longer matters because changes in both the technique and technology of text production within moving images has been reconceptualized. In a computer context, a new digital conception of text which spins, flips, and tumbles has emerged. The DVE (digital video effect) notion of text that moves occupies a far different conceptual space from that occupied by Letraset white text on a black background title card. The problems of whether text is alligned in a straight line or not become irrelevant in the new context. A problem that goes away is the result.

What are the implications of these processes and models for Digital Cinema? Taken as a whole they reveal the dynamics of change and its structure. They are signposts that remind us that change changes. Innovation restructures not only process but outcomes as well. Digital processes will seek out and enhance digital attributes. Yes, McLuhan is right, we navigate forward looking through the rear view mirror. But at a certain point one gets the mirror out of the way and starts looking through the windshield. With the new gaze the third phase begins.

Digital Cinema is a phase three technological development. By seeking out and enhancing digital attributes, digital cinema acknowledges a century or more of abstract art and an age of information. **The Songs Of Steel** is not photorealistic at all. To take a photograph, shoot film. To work digitally, digitize.

Moving Image Production Phases

Moving images from the imagemakers point of view, go through a four phase process regardless of medium, format, or scale. The four phases are: pre-production, production, post-production, and dissemination. These processes apply whether the production is film, video, or digital in format. These processes are engaged equally regardless of production status. Wether a project is amateur or professional is irrelevant.

Pre-production is concerned with answering the fundimental questions: what am I going to do and how am I going to do it? Scenario development and visualization of it are primary activities of this stage. To think of going over to Walmart and buying videotape to record a baseball game is just as much a pre-production activity as storyboarding an action sequence for a Hollywood epic. Logistical and financial planning are other scalable activities of a pre-production process. Deciding to get in the car and when to drive over to the field for the game while remembering to bring some cash for gas is just as much a part of logistical and financial pre-production as is how to put together and pay for **Waterworld** at the other end of the continuum.

Production is concerned with element creation. Quite often it is the shortest, but often the most intense phase of a project. Images and sounds are constructed, recorded on tape, on film, or disk. They are the raw materials of a project. Production, like pre-production, is a scalable process applying equally to projects of all formats and sizes.

Post-production, the third phase of the process, compises the tasks of image editing and soundtrack construction. The creation of meaningful sequences out of production elements is the result of these tasks.

The dissemination phase connects a project with its audience. The scale of complexity of this stage can range from bringing a tape to show to a group of friends to the global distribution of a first run motion picture..

All four phases are profoundly affected by digital restructuring. New digital tools available at all price levels will reorganize moving image production into a very different form with very different dynamics, values, and purposes. The new tools are here and the process is underway. Here are some examples.

Dramatica, a scenario development software package, alters the pre-production process. Dramatica is an AI (Artificial Intelligence) application. An expert system is built into it. This does not mean that one can put in a collection of names, dates, places, and information, shake and bake the elements, returning a few hours later ready to recieve a finished script as output. What actually occurs is an implentation of the self-organizing aspects of the the emergent systems paradigm. By means of AI, Dramatica acts as an advisor to the scenario writer. The program poses questions regarding various elements of the emergent work including clarity of story structure or character development. The program poses increasingly numerous and subtle questions. Dramatica extends the statement, "I read the script..." to include "and the script reads me." Clearly something new has emerged.

The pre-production process of pre-visualization is also transformed by digital technology. Storyboard Artist, a pre-production visualization application, solves a problem with storyboards. Traditionaly storyboards are similar to comic books in that they are a sequence of drawings representing an action sequence. As they are a sequence of still silent images, they do not accuratly reflet the dynamics of time within the production. As Cinema is a time art, traditional storyboards are limited in this respect. Storyboard Artist utilizes Quicktime, a cross-platform standard developed by Apple to support dynamic data. Accordingly, a Storyboard Artist project always presents a consistant unfolding of time.

Digital storyboards point the way to a non-linear, emergent organizational approach to the four phase production process. It is possible to start editing, a post-production activity, during pre-production before any sequence is recorded. Sequencing, timing, camera position, and more can be worked out in pre-production. Storyboard Artist becomes a Digital Cinema simulator. By working out sequences in advance, problems can be anticipated. The simulation process feeds insights forward into the actual production.

Non-linear structure reorganizes the sequence and order in which creative participants contribute to the development of a project. For example, in the industrial linear analog context, musicians rarely become involved until post-production editing. Their music must be timed to actual edited sequences. As a result, while their musical contributions greatly enhance any project, because of the late stage that they enter a project, the scope of their contribution has definite limitations. In a non-linear feedforward reconceptualization of pre-production that Storyboard Artist represents, virtual footage can be made. Now musicians can participate in the beginning of a project rather than waiting until the third stage pre-production process begins. They can contribute more as a result. A virtual rendition of the work, animated and drawn, emerges from a new fully digital conception of pre-production. As the project moves into production, digital storyboard sequences can be replaced with more fully realized footage as it is produced.

At the production phase, the digital restructuring continues. Cameras that record digital rather than analog imagery are becomming operational at all levels of production. One of the most innovative is the Ricoh RDC-1 digital camera. It weighs nine ounces and can record up to 492 still images, 100 minutes of sound, or four full motion five second JPEG video sequences, with sync sound at 30 fps onto an eight meg PCMCIA. This card has the dimensions of a credit card. The RDC-1 is the first phase of what is to come. Record five second secquences now, record hours in the near future. By recording digital in the first place there is no need to undertake the cumbersome and time consuming task of digitizing analog video or film into a digital format. This is a phase two technological process that consolidates or eliminates separate tasks in a production sequence.

At the post-production stage, Scene Stealer, an ISA hardware card with accompaning applications software, continues the process of making certain problems irrelevant. The process of logging footage is a time consuming task. This tedious yet necessary task is the process of cataloging the mountain of footage that any production generates. It involves identifying footage content, recording the time code location for the start and stop of each shot, describing wether each shot is a long, medium, or close-up, and a great deal more. To do this well requires spending six hours of logging for every hour of tape recorded. The Scene Stealer software contains an AI element. The application is sensitive to difference. It can differentiate between pans, zooms, and camera movement on one hand, and actual camera starts and stops. This capability means Scene Stealer can identify the starting and stoping points of a shot. If it senses a 100% change in the arrangement of pixels in an image, it knows that there is a 99% probability that the shot has ended. A new shot will have a new arrangement of pixels. With a vcr on playback, the program can be set to grab and digitize a user specified amount of frames, perhaps one frame out of every thirty. As it identifies and records, the software automatically notes the time code location for the start and stop of every shot on the tape. Scene Stealer also records the audio track. A comprehensive abstract and catalog of a sequence of moving images has been created automatically. Once again new technology has restructured a production process.

Premiere 4.2 is a non-linear editing software application.The program reflects the digital restructuring of post-production. Priemere makes irrelevant the problem of video tape or film footage shuttling. **The Songs of Steel** production process yeilded approximatly 22 hours of footage. It took a year, at the rate of one day a week, to edit that mountain of footage down to one hour and 52 minutes. It is probable that up to one third of that time was consumed waiting for videotape to rewind or to fast forward. In analog video editing, there appears to be a perverse law at work. It states thqt whatever shot the editor is working with, the next one the editor wishes to work with is located at the other end of the tape. Premiere brings cut and paste into the editing process. Under digital conditions the editor grabs an image and brings it into a time line. When compaired to the analog processes of analog film and video editing, digital word processing for moving image sequences is a very different way to edit moving images. It represents both a process but more importantly, a conceptual shift in not only how but what is done in the post-production process.

Dissemination, the fourth stage of the moving image production process is also reorganized under digital conditions. The World Wide Web is in the beginning stages of developing the capacity to process moving images. When that is accomplished, the drive-in will be transformed into the surf-in. Because the web is key word searachable, both Digital Cinema producers and viewers can search out the other. A highly disperrsed audience on a global scale can form together to become a virtual audience for a virtual movie. This is only possible as a result of digital restructuring of the process.

The moving image production system that we end with is far different than the one it replaces. It is the result of the interaction of a new paradigmatic framework mutually interacting and informing a new array of digital tools. The new view reveals emergent systems are self-organizing, self-maintaining, self-renewing, self-transcending. As we have seen, Digital Cinema works organically grow. Self-organizing. Digital technology flattens chains of process sequences. Self-renewing. New opportunities revealed by the new pardigmatic lens and operationalized by new digital technologies creates feedforward and feedback loops of creativity and innovation. Self-trancending.

Emerging from digital pluses, wrought of silicon and vision, a Digital Cinema reveals images of beauty and awe.

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Wyoming Tombstone Symbolism: A Reflection Of Western Culture

by John Cochenour & Landra L. Rezabek

Abstract

Eleven Wyoming cemeteries are examined for visuals that can be related to Western culture and tradition. A rich tradition of such symbols found in the study are presented within the following categories: environment, artifacts, and people. The study concludes that memorial visuals reflect to a great degree the culture and traditions of the surrounding society.

You was there when Ed got hisn,
Boy that killed him's still in prison,
And old Lucky George is rich and livin' high.
Poor old Tom, he come off worse,
Got his leg broke, died of thirst,
Lord but that must be an awful way to die.
Bruce Kiskaddon

Cowboy poetry speaks to people about many themes, but the struggle of living life in the West is one theme that recurs frequently. As the above stanza from Kiskaddon states, being a cowboy was never as glamorous as it appears in the movies. Not withstanding this reality, most people who live in the West, certainly those who live in Wyoming, seem to be proud of the traditions, individualism and toughness demonstrated by the earlier occupants of this land, native and emigrant alike. This attitude is evident from the high number of Western motifs that can be seen on the tombstones in Wyoming cemeteries. In eleven cemeteries in Wyoming, the authors classified a large number of visuals pertaining to life in the West that are summarized in this paper. The purpose is to demonstrate the importance of Western culture and traditions of the people who live and die in Wyoming by sharing tombstone symbolism—representations of the activities and environment of the living through the memory provided by the dead. In this way the authors hope to contribute to answering the question, "What can the images on tombstones tell us about the people and culture that produced them?"

The visuals are arranged in the following categories: environment, artifacts, and people. Within each category, visuals and interpretations will be presented from tombstones that reflect some aspect of Western life or tradition. We have interpreted this tradition as that represented by the American pioneer during the latter half of the 19th century. Unfortunately, this limitation ignores the significant traditions and

Figure 1
Water—windmill and stock tank.

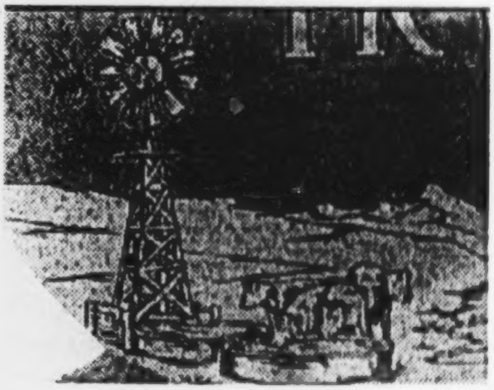


Figure 2
Water—Fishing in stream.

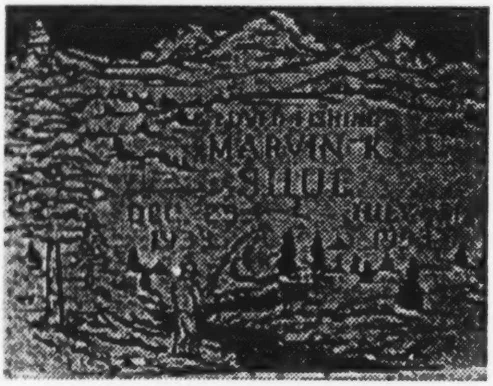
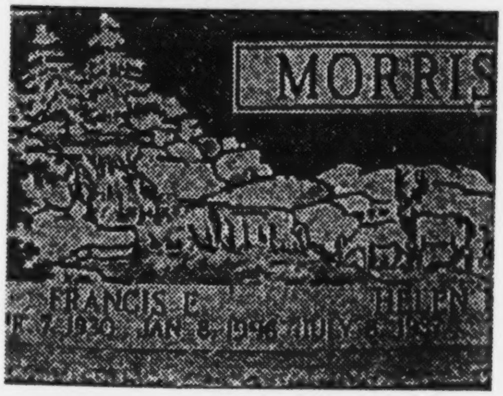


Figure 3
Water—mountain waterfall



culture of the Native American as well as others.

Environment

As with any culture, Western tradition is very much influenced by the environment in which it exists. In Wyoming, the most significant features of the environment are the broad vistas and high elevations, the semi-arid climate, the wind, the natural resources and geologic features, the wildlife, and the plant life. The environmental features that occurred most frequently on tombstones were related to water, wind, wildlife, trees, wildflowers, and of course, the mountains.

Traditionally, water symbolizes a source of life, a vehicle of cleansing, and regeneration (Chevalier & Gheerbrant, 1994; Hall, 1994). Within the Western traditions of Wyoming, examples of the use of water as an environmental, artifactitious, and personal symbol on tombstone visuals are numerous. Figure 1 is a good example of the use of water to symbolize life in a semi-arid region. The windmill, stock tank, and cattle combine to form a picture of a life spent where water was hard bought and welcomed—a source of life. Figure 2 is of a stone that on the surface portrays a life that enjoys fishing. This sport is certainly not limited to the West, however the combination of the mountains, evergreens, and stream is a Western motif that provides strong symbolism of the regeneration of the soul. The deer, waterfall, rocks, and trees in Figure 3 seem to speak to each of the water themes and symbolizes a pure, unblemished setting that is full of life and generation.

Figure 4
Wind—windblown trees.

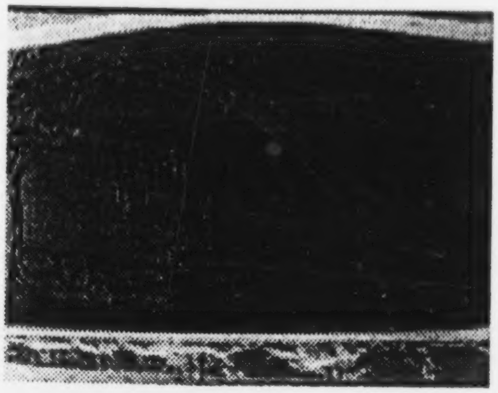
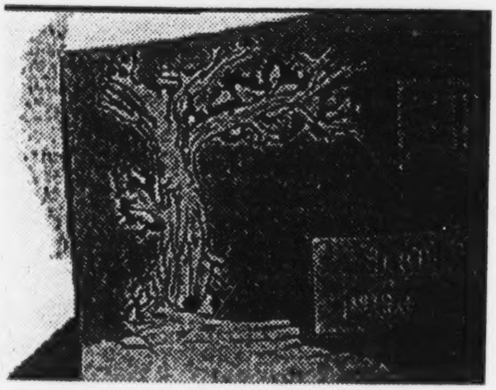


Figure 5
Wind—banner tree



The wind in Wyoming is legendary and is an integral part of the region's folklore. For example, it is said that in Wyoming the snow doesn't melt—it just wears out. The wind is an elemental force that is often associated with God's breath or as a messenger or manifestation of God. However, on the stone shown in Figure 4 the wind is probably used to characterize the setting as farm on the high plains. The symbolism helps the observer to place this ranch in Wyoming, not some other rural setting with a calmer climate. Figure 5 illustrates the effect of the wind in the cold, dry air at higher elevations. Known as banner or flag trees, the strong, cold winds at higher elevations destroy new

Figure 6
Plants—evergreen trees

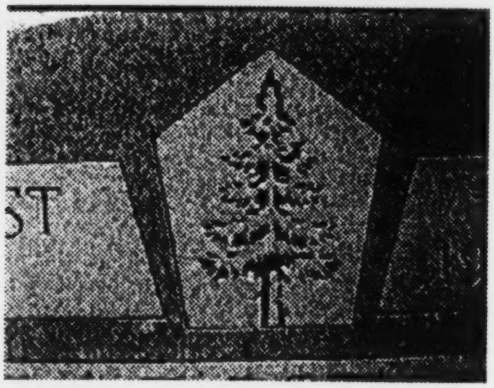
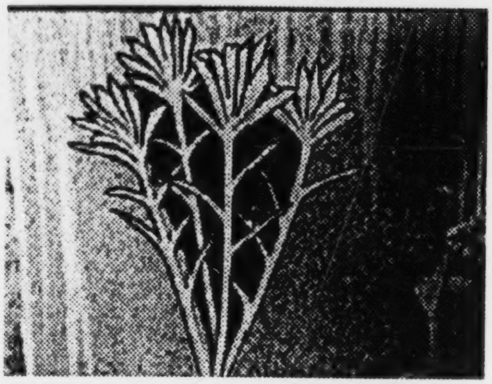


Figure 8
Plants—Indian Paintbrush



growth on the windward side of exposed trees. Along the tree line (trees don't grow above this elevation), these twisted and bent trees often will not grow above the shelter of nearby rocks and are called "krummholz" trees. These trees may look strange but may be several hundred years old, and their use on the tombstone may symbolize an indomitable spirit, persistence, and toughness.

Trees are rich and widespread symbols with multiple meanings. One of the most common is its symbolism of life as a connection between earth and sky. The simple pine tree in Figure 6 could be symbolic of the relationships between heaven and earth, and the evergreen is representative of the immortality of the soul (Chevalier & Gheerbrant, 1994). Evergreens are found abundantly throughout the Rocky Mountains and certainly are numerous Wyoming. Figure 7 continues the tree motif, but displays only the pine cones on a branch which conveys a message of immortality and fertility (Hall, 1994).

Flowers also have multiple meanings, but flowers generally symbolize a passive principle. Like the chalice or rain, flowers are represent a receptacle of God's instrumentality (Chevalier & Gheerbrant, 1994). Flowers are abundantly represented on tombstones, but in Wyoming, as well as in other Western states, wildflowers seem to occur more frequently as a tombstone motif. Figure 8 is a good example of the use of wildflowers, depicting Indian Paintbrush, the Wyoming State Flower, used on a family stone in Wheatland.

Although a large variety of wildlife roam the Wyoming mountains and high plains, perhaps the most representative large mammal is the pronghorn antelope. There are nearly as many antelope in Wyoming as there are people and

Figure 7
Plants—pine cones

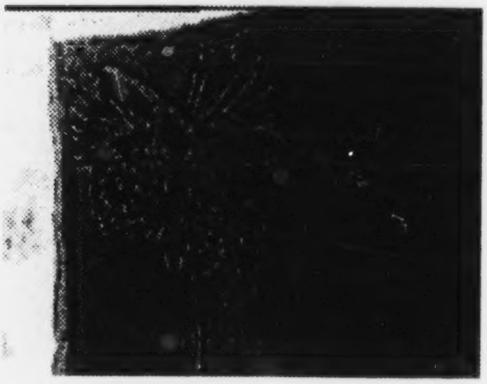


Figure 9
Wildlife—pronghorn antelope

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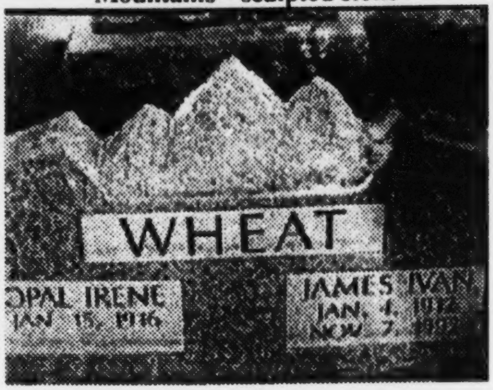
Figure 10
Mountains—sculpted stone



this number comprises nearly half of the world's population of pronghorns. The pronghorn is the second fastest mammal in the world, being exceeded only by the cheetah, and is one of the most commonly seen large animals in Wyoming (Pitcher, 1993; Roberts, Roberts, & Roberts, 1994). The symbolism of the pronghorn is distinctly one of Wyoming and the West and is associated with keen eyesight, swiftness, and like the wind, one of God's messengers. Figure 9 is a good example of the pronghorn antelope imagery on tombstones.

Dominating the environment of many Western states, and certainly that of Wyoming are the mountains. The mean elevation of Wyoming is 6700 feet and the University of Wyoming is the highest NCAA Division IA campus in the United States at 7200 feet in elevation. There are 12 major mountain ranges in Wyoming, and most people who live in Wyoming live in the shadow of at least one of these ranges (Pitcher, 1993). It is no wonder that one of the most common motifs on Wyoming tombstones is that of the mountain landscape. The mountains represent the meeting of heaven and earth—the home of the gods. Many mountains have been given a quality of holiness by the people who live near by, and many diaries of Westerners make note of the majesty of the Rocky Mountains. In his journal dated 2 June 1846, mountain man James Cayman noted, "the mountains that surround this vally are pictureesque and many places beautifull being high and near the base smoothe and well set in a short nutericious grass [sic]" (Cayman, 1984, p. 258). The mountains make not only a beautiful picture, but symbolize the higher properties of the soul, the bounds of human development, and the abode of deities (Chevalier & Gheerbrant, 1994). Figures 10 and 11 are typical uses of mountain symbolism on tombstones.

Figure 11
Mountains—landscape

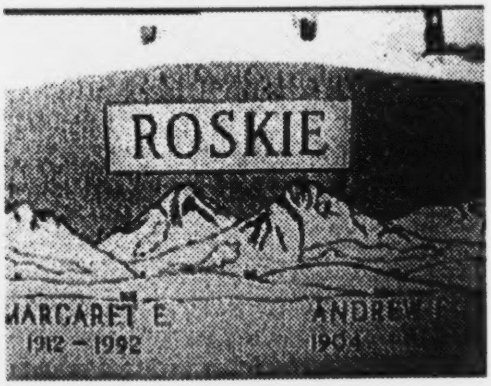
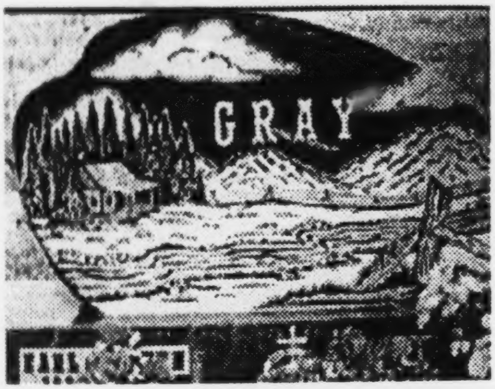


Figure 12
Cabins—traditional log



Artifacts

The artifacts of Western culture are primarily technologies that have been developed to cope with the Western environment. Such technologies are represented by homes that use available materials, apparel to match the environment and livelihoods, transport systems to deal with the rough country and vast distances, mechanisms for protecting and identifying belongings, and methods for obtaining needed resources. Each of these technologies have been portrayed to some degree on Wyoming tombstones.

There are many images on tombstones that either symbolize everlasting shelter or possessions that have been left behind in regional relocation or in death. Log cabins are a common example of this theme in Wyoming cemeteries. For many early pioneers, a permanent home was simply a dream. Their imaginations coupled together with available resources often fashioned rather desperate shelters. The log cabin in the mountains was often small, real windows a luxury, and dirt floors a reality (Butruille, 1995). Nonetheless, the log cabin represented a safe place to live and shelter from the weather. Figure 12 is a log cabin refuge for eternity for a couple buried in Sundance, Wyoming. A more up-to-date cabin is pictured on the back of a marker in Figure 13.

Figure 13
Cabins—modern version

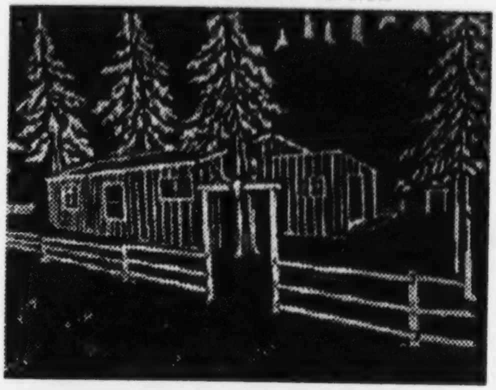
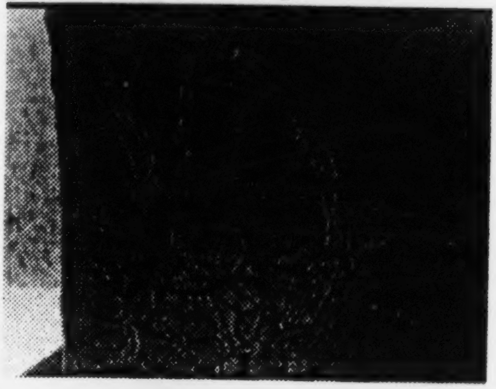


Figure 14
Transport—wagon wheel



Getting across Wyoming was a major effort in the early days of Caucasian settlement and the various modes of transportation were the lifeblood of sustenance and growth for many Wyoming towns. Wagon trains on the Oregon Trail, freight and mail wagons on the Overland Trail, and the transcontinental railroad are each either directly or indirectly seen in the symbolism used in Wyoming cemeteries. The most common symbol of the wagon motif is the wheel. In itself, the wheel is symbolic of movement and liberation (Chevalier & Gheerbrant, 1994), but the wagon wheel common in the cemeteries represented here seems to be reminiscent of the struggle and persistence of pioneer families. The broken wheel shown in Figure 14 could also indicate the impermanence of mortal life or perhaps bonds broken. As transportation technologies evolved, construction of the transcontinental railroad began at the Wyoming border in 1867 and became a major influence in the life and development of southern Wyoming. Cheyenne and Laramie were both end-of-track towns and hosted the procession of workers and hangers-on known as Hell-on-Wheels (Pitcher, 1993). The high point of elevation along the transcontinental route is just east of Laramie at 8,640 feet (Burt, 1991). Throughout the cemeteries in southern Wyoming, one will see references to the railroad in general and the Union Pacific Railway in specific. Figure 15 is typical of this imagery, while Figure 16 includes carpentry tools and a min-

Figure 15
Transport—railroads

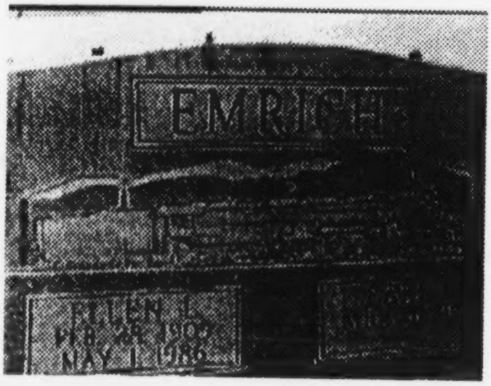


Figure 16
Transport—railroads

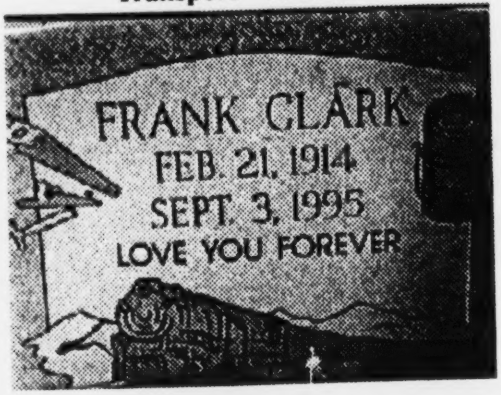
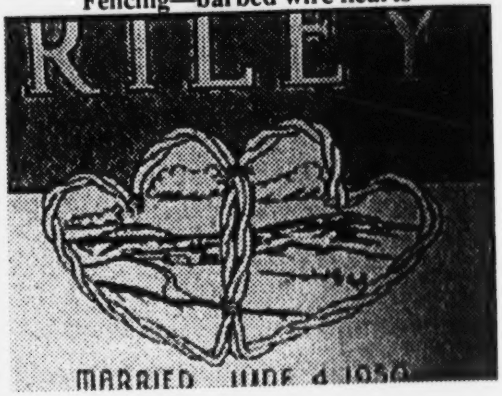


Figure 18
Fencing—barbed wire hearts



ers bucket with the railroad train, a melding of important Western occupational symbols still significant today.

Gates have universal significance as passages and particularly religious meaning relating to passage from the profane to the sacred (Chevalier & Gheerbrant, 1994). Gates to Western ranches and farms are often highly decorated (see Figure 17), and appear on tombstones with a combination of secular and religious meanings (see Figure 13). Associated with gates, one will see a variety of fencing used to protect property, hold livestock, or direct drifting snow. Figure 18 is an interesting use of barbed wire fencing to symbolize permanence and protection in a Western motif.

Branding, or burning a code or identifying mark on the hide of an animal, was a Spanish tradition that was used in the American West to compensate for the lack of fencing on vast open ranges. Each brand is unique and has a registered owner; many families in Wyoming owning more than one brand as a result of marriage and inheritance (Pearson, 1996). These visual references to family, tradition, and ownership appear throughout the West and are often used on tombstones. Figure 19 combines the family brand with the windmill, cattle, and the sun to present a very positive symbol of Western life.

People of Wyoming

One thing that is not unique to the West, but that is reflective of individual pride and survival is the identification with one's name and family. A person's name is the most common marking found on a tombstone. In some cases, this inscription is simply a handwritten scratch on a rock. Figure 20 shows a rock slab with no vi-

Figure 17
Gates—ranch gate entrance

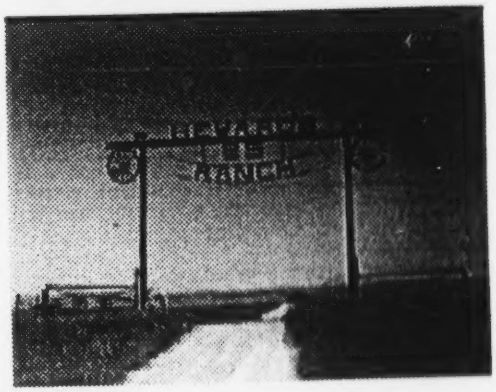


Figure 19
Brands—with cattle

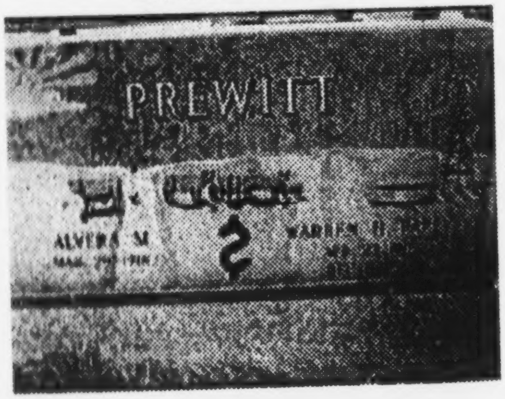


Figure 20
People—names

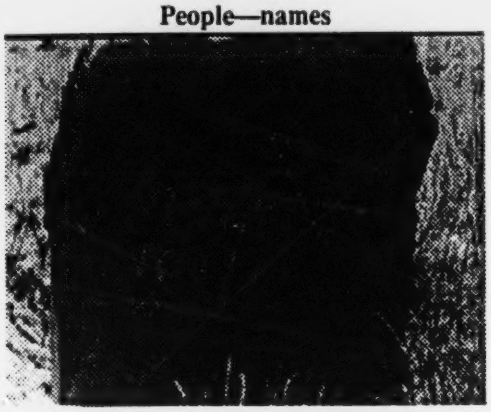
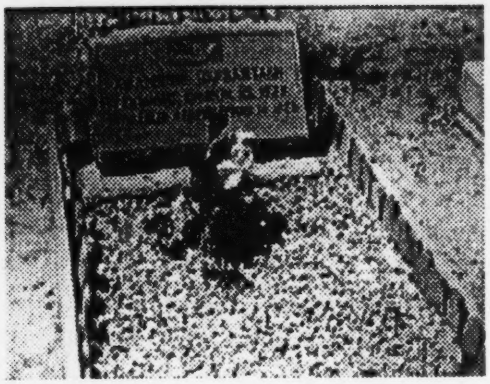


Figure 22
People—Greek



sual and only four scratched names: BERGEY WRAGER FRANCIS RIMMEK. Such rocks are common throughout the older cemeteries in Wyoming leaving one to wonder about the persons memorialized. Is this the grave of four people? Of two? Or does this marker identify the resting place of one early settler?

In life, people have an urge to scratch their name out in a "Kilroy was here" tradition. Immigrants traveling across Wyoming in search of new homes or new adventures often engraved their names in the rock faces that were located near the major trails. Three major sites, Names Hill, Register Cliff, and Independence Rock, are all adjacent to either the Overland Trail or the Oregon Trail. Independence Rock, a landmark that travelers hoped to reach by Independence Day, is probably the most famous milestone along the Oregon Trail and is mentioned in the diaries of many travelers (Clyman, 1984). At one point, stone cutters charged from one to five dollars to cut a person's name in the rock, and about 50,000 names have been etched over the years, although erosion has claimed many of them now (Burt, 1991; Moulton, 1995). Names, a mark of one's presence or passing, are a visual reminder of the people who settled the West.

These settlers' names originate from many ethnic backgrounds. The American West was a beacon of opportunity to people throughout the world, and many of those immigrants passed through Wyoming, stayed to work in the mines or on the railroad, or settled on the land in some agricultural or other pursuit. The most uniquely recognizable ethnic backgrounds found in Wyoming cemeteries were Asian, Greek, and Russian. This was due in part to the use of their

Figure 21
People—Japanese

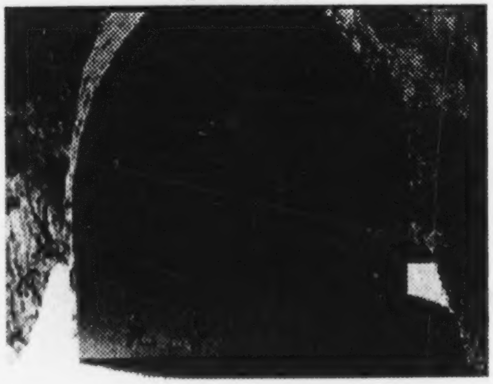


Figure 23
People—Russian

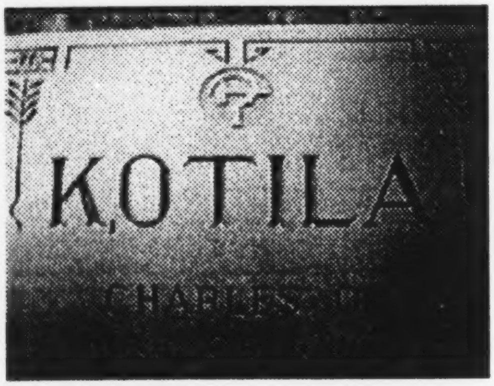
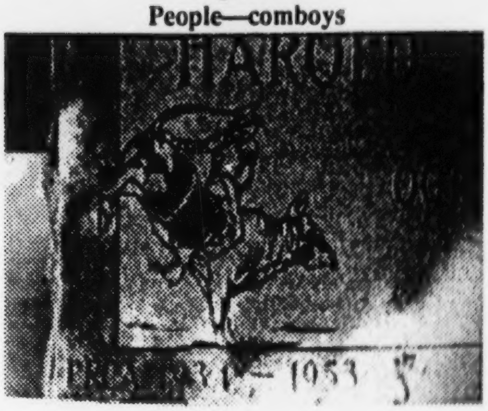


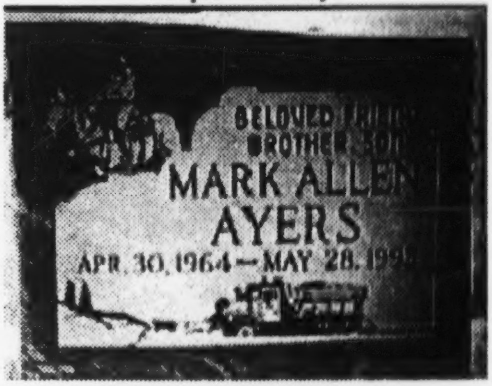
Figure 24
People—comboys



native alphabets and languages on the headstones as well as icons that differed from the common Christian symbols found in the United States and Europe. Figures 21, 22, and 23 are examples of the diversity that can be found throughout Wyoming still today.

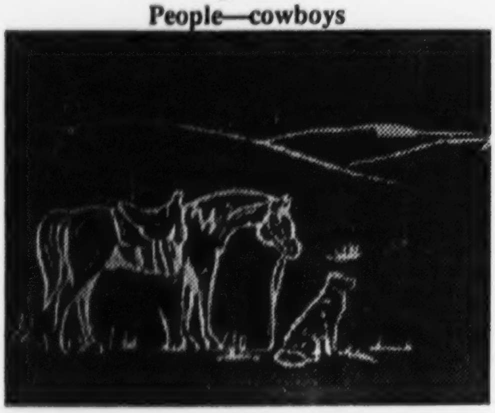
The occupations that provided work for this hardy group of Wyoming settlers were varied, but this paper focuses on livelihoods that commanded some of the larger numbers of people, although the population of Wyoming has never been great. One characteristic of Wyoming that visitors notice is the sense of emptiness that prevails in many areas. The population of the state in the 1990 census was still only 453,588. When these numbers are distributed over 97,914 square miles, people describe Wyoming as "a moderate sized city with very long streets". It is easy to imagine that in some occupations, a person could live a very solitary existence. The occupations most often reflected in tombstone motifs were associated with agriculture, railroading, mining, and timber.

Figure 25
People—cowboys



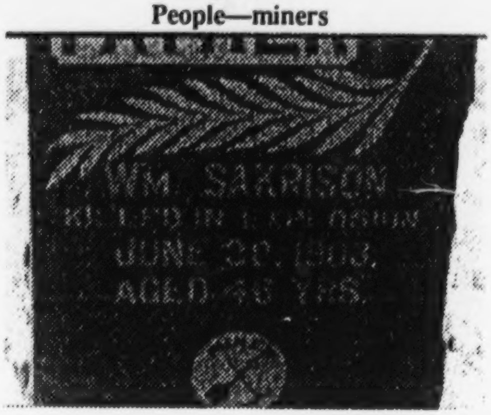
In addition to these vocations, the lifework of the cowboy is very much associated with the West. The American cowboy is an intriguing historical figure with origins in Virginia and the eastern colonies as cowkeepers, cowdrivers, and cowpen men during the 1600 and 1700s. Often these herdsmen were slaves known as cow hunters or graziers and were highly skilled on horseback. In Texas during the early 1800s, the Anglo-American cattle traditions were blended with those of the Spanish-Mexican to shape the cowboy of popular legend. The name cowboy seems to have been associated with raids during the Revolutionary War to obtain cattle to feed the armies, and also from raids upon the Mexican cattle ranches by Texas settlers. It would seem the early use of the term cowboy had some negative connotations (Tinsley, 1981).

Figure 26
People—cowboys



The life of the cowboy during the heyday of the West was not easy. It could be dreary and full of hardship and hazard. The work was seasonal and low paying, tedious and lonely, and occasionally unpleasant and dangerous. In spite of all this, the cowboy hasheld a fascinating appeal and romance that has reached legendary proportions. The allure of the West is still typified by the cowboy, as evidenced by the bucking bronco and cowboy logo on the Wyoming

Figure 27
People—miners



license plate. Many people of Wyoming seem to take great pride in the cowboy tradition and use the many cowboy motifs to memorialize families and friends. Figure 24 reflects one aspect of the cowboy tradition—rodeo. This headstone uses the a bull rider visual to mark the resting place of a professional rodeo rider. Figure 25 is a more typical use of the cowboy image. This young man was most likely not a professional cowboy, but rather a person involved with horses and employed as a snowplow driver. Saddles, boots, horses and other items associated with the cowboy lifestyle are common on Wyoming tombstones. Figure 26 combines Western themes with symbolism of the fallen comrade, typified by the riderless saddled horse, and the life well-lived.

Mining has been an economic factor from the beginning of Wyoming's history. Coal, copper, platinum, gold, trona, and uranium are among the resources that have been sought in Wyoming (Burt, 1991). The symbolism of the mines and miners represents persistence, danger, hard work, and prosperity. The following figures are taken from the Hanna cemetery and are all associated with coal mining. Figure 27 highlights the work ethic of mining with the pick and shovel; the notation, "killed in explosion," is indicative of the danger. Figure 28 is of a memorial dedicated to miners who have lost their lives in local mining accidents. The back side of the memorial is full of names as well.

Figure 28
People—Miners

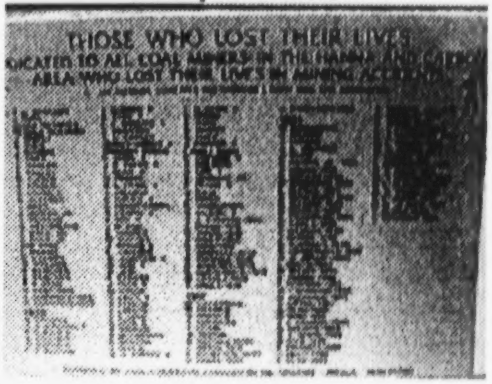
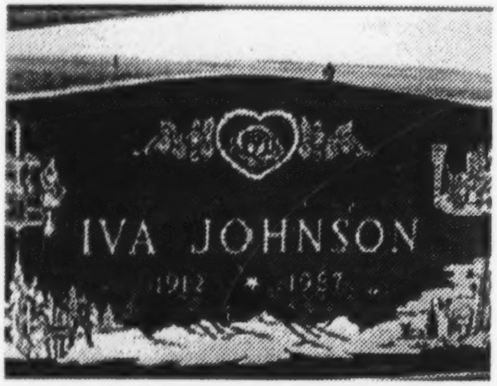


Figure 29
People—wife's stone



Two very interesting stones are in a family plot in the Hanna Cemetery. What is remarkable about both stones is the life stories that are told in visuals around the perimeter of the stone. The wife's stone (see Figure 29) includes visuals that portray family, the mountain environment and wildlife, needlepoint, a delicate rose, and cooking on a wood stove. These visuals symbolize a woman whose life was dedicated to service (food and cooking), gentleness (children and deer), femininity (rose), and family. Figure 30 is a close up of the cooking scene. For many pioneer women, an indoor stove was a wonderful luxury since it allowed one to work standing up, rather than stooping over a campfire (Butruille, 1995). The visuals on the husband's stone (see Figure 31) depict a life of work and a variety of occupations. Around the top of the stone appear visuals of an ocean fish-

Figure 30
People—cooking

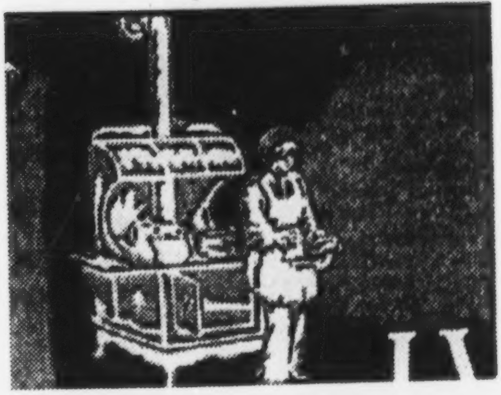
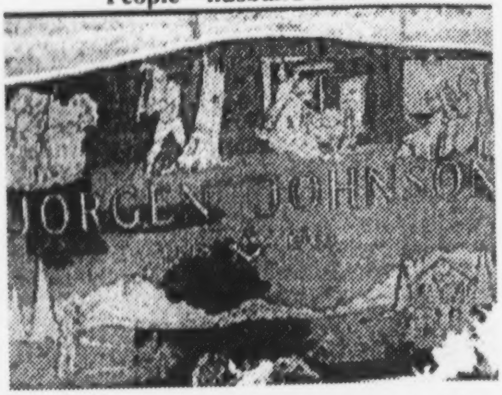


Figure 31
People—husband's stone



erman, a lumberjack, a miner, and a barber. At the bottom of the stone, visuals depict a man with his family in front of their home and a duck hunter. The combination of visuals on this tombstone lead one to the interpretation that this individual immigrated to Wyoming from a seafaring/fishing country, worked as both a lumberjack and miner, and finally worked as a barber later in life. The deceased seemed to enjoy the out-of-doors and provided for his family.

Conclusion

As the tombstones selected demonstrate, a society's culture is reflected in the memorial visuals that can be found in cemeteries. Wyoming cemeteries are full of religious symbols that are drawn from the beliefs of the people that use them, but the traditions of the West are prevalent themes as well. The folklore of cowboy and pioneer life, Western flora and fauna, environmental and natural forces, and the enduring mountains can be discovered throughout the sepulcher art used in Wyoming cemeteries. If, as conference attendees, you find yourself in Wyoming with time on your hands, the culture and traditions of Western life can be seen throughout any Wyoming cemetery. Visit one and see what the visual cues reveal about life and death in Wyoming.

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Hypermedia as a Distinct Medium: Challenges for Designers

Barbara I. Clark and Nancy Nelson Knupfer

Abstract

As multimedia development software becomes easier to use and more powerful, instructional designers can begin to think about ways of incorporating the Internet into their lessons. This paper introduces some questions that should be considered prior to stepping into that next level of instructional design.

Each year brings new enhancements to hypermediated software and instructional designers must therefore face new challenges as they apply the software in practice. Product enhancements provide authoring software with increased capabilities for designing and producing multimediated instruction. These enhancements permit new possibilities for the appearance and functionality of courseware, and thus pose new challenges for instructional designers.

Further, the increasing ease with which the improved authoring software can potentially be used, could lead to a situation in which people produce instructional courseware without the aid or advice of instructional designers. Products that result, whether stand-alone desktop systems or those that incorporate other resources such as material from the world wide web, have vast potential. Yet the new technological enhancements will not necessarily be applied in a way that truly improves the instruction.

Technology enhancements offer fancy features that can make the instruction seem "eye-catching" and special. These "bells and whistles" seem to have great potential but often take the lead and interfere with instructional design. Indeed, if misapplied, the software enhancements could actually befuddle the learning process.

A framework is needed to provide guidance for people who must produce instructionally sound products that utilize a mix of stagnant text, text as a dynamic visual image, still and motion visual images, and audio within a hypermediated format. Such a framework can provide the necessary guidance to make wise use of the new enhancements to the technology.

Links and connections can take on different dimensions. The processes of linking visual images with visual text, and making connections between realia and the meaning of the images in a hypermediated format, lead to questions about effective instructional design of courseware that incorporates those processes. Moreover, those processes cause software evaluators to rethink the standard for effective and appropriate presentations.

This paper addresses some of the challenges and dilemmas faced by two instructional designers as they incorporated visual imagery and audio components into the design of two distinct interactive multimedia products. Each instructional product was designed as a professional development seminar, or series of instructional seminars, for two distinctly different groups of adult learners. One product was designed for preservice teachers who spend a significant amount of time on campus and in classes, while the other was designed for practicing social workers who are employed in isolated, rural areas where access to professional development is extremely limited.

The two multimedia products present content-specific information pertinent to teachers and social workers. The learners use visual text, still images, still and animated graphics, sound, and full-motion video vignettes contained on a laser videodisc or CD-ROM. The two programs provide learners with new information, observational examples, and interactive practice about content specific to their fields of teaching or social work. There are many similarities between the instructional needs of the two groups of learners, as well as the products' capabilities. Therefore many design aspects are common to both, however the user interfaces between the two programs are very different.

Because it is quite extensive in scope, the social worker's program is being developed as a series of ten separate modules with similar functionality. It is designed to accommodate people who have very limited computer skills. It uses such traditional design elements as text-based menus, buttons, pop-up text boxes, concept maps, and the choice of receiving audio-based, text-based, or a combination of audio and text within the instructional interface (see Figure 1).

The teacher's program uses a graphical user interface (GUI) that portrays familiar objects that can be found in traditional school environments. For example, one menu depicts a hallway, classroom doors, books, and chalkboards for the learner to choose among. Another menu depicts an advisor's desk with the topics of advisement hung on a bulletin board display behind the desk. The learner can access information by selecting a topic within the graphic (see Figure 2). This program also contains an electronic notebook in which the learners can write their questions and reactions to their observations. Both programs are hypermediated, employ video vignettes, and contain a presentation component, an application component, and an assessment component.

Both product design teams were able to follow some common theoretical elements of interactive system design, yet both broke new ground in their own way as they strove to create a product best suited to their given audience and instructional needs. Formative evaluation was conducted on both programs (Clark, 1995; Knupfer, Barrett, & Lee, 1995). In addition, summative evaluation was conducted on the product designed for teachers (Clark, 1995). Results of the summative evaluation of the teacher's multimedia product indicate that significant differences occurred in the abilities of teachers who used this program to identify, understand, and explain specific teaching strategies they observed in the video vignettes as compared to those who did not use the multimedia.

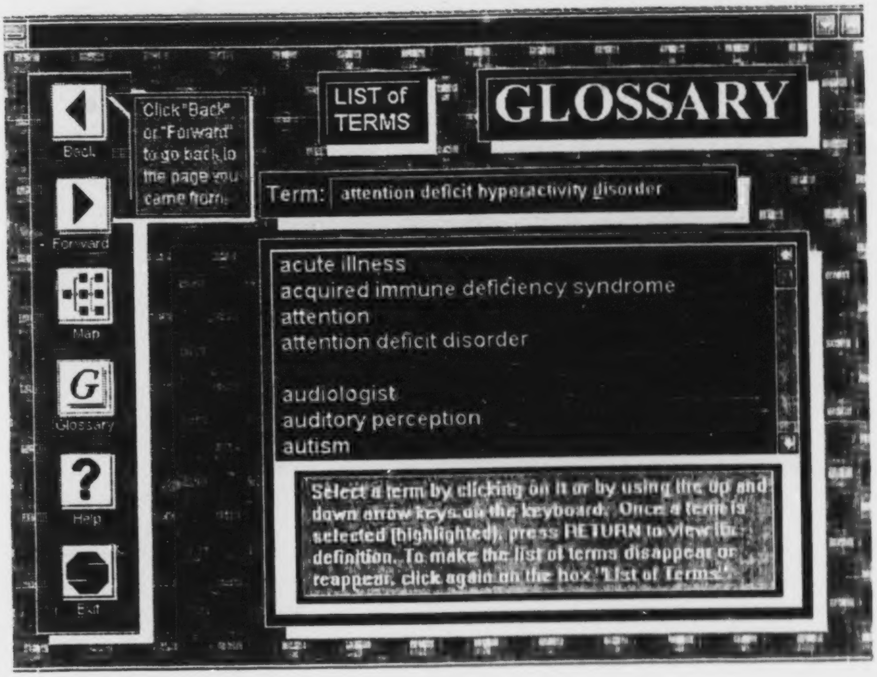
The product designed for social workers is much more extensive; it represents a series of ten distinct topics of study that each carry three continuing education units of credit for social workers who complete the training. Each topic is considered as a separate course of study and is contained in a separate, but coordinated module. Although the ten modules are designed as a set of training for social workers, the modules can be studied in any order and in any amount. The criteria for receiving credit for each module rests in completion of an on-line test with a passing grade. The modules are being phased into numerous communities as the development progresses and eventually all ten modules will be in place. As each module of the social work series is developed, it goes through formative evaluation and field testing. Summative evaluation will be conducted after several modules have been placed into the social work offices in various communities.

Success of any product's effectiveness will be affected by the learners' acceptance or attitude toward the product, the product's match with learners' needs both in a technical sense and in terms of content, and the product's ability to be used within a given environment. Therefore, any evaluation must also consider the reactions of both the social workers and preservice teachers to using the hypermedia. Results of the evaluations to date suggest some guidelines that instructional designers should consider when designing such products. Further, as we think about ways to improve those products and enhance their content and functionality with material from outside sources, such as those from the Internet, we need to be able to evaluate the quality of the outside resources as well.

Interactive multimedia computer tools can expand our ways of thinking and perhaps encourage metacognition, more deeply than software that contains only standard text, few images, or non-interactive video. In interactive multimedia contexts, learners browse and search through video, images and text; form interpretive thoughts; make connections between visual text, still images, and full-motion video images; and cluster discrete fragments of information into meaningful ideas. The challenge for instructional designers is to take the set of guidelines that has been developed for interactive, computer-based instruction, and extend them to include guidelines that consider the dynamic nature of the myriad possibilities that become available with new technological tools, resources, and techniques.

As authoring tools become more transparent in functionality and more people become skilled at incorporating the Internet into their work, the volume of interactive, multimediated software intended for self instruction is likely to increase. This increase signals two things: more software that is produced by novice instructional designers or people who have limited knowledge of techniques appropriate to efficient learning, and the need for guidelines to use in the production

Figure 1
Social Workers' Project Sample with Icon and Text User Interface


LIST of TERMS
GLOSSARY
Back
Forward
Map
Glossary
Help
Exit

Click "Back" or "Forward" to go back to the page you came from.

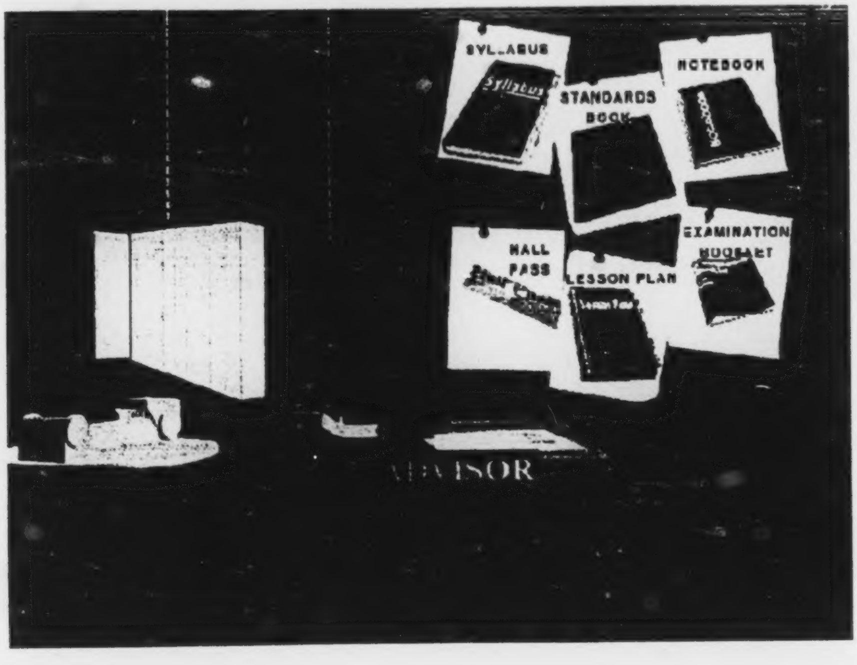
Term: attention deficit hyperactivity disorder

acute illness
acquired immune deficiency syndrome
attention
attention deficit disorder

audiologist
auditory perception
autism

Select a term by clicking on it or by using the up and down arrow keys on the keyboard. Once a term is selected (highlighted), press RETURN to view the definition. To make the list of terms disappear or reappear, click again on the box "List of Terms".

Figure 2
Teachers' Project Sample with Graphical User Interface


SYLLABUS
Syllabus
STANDARDS BOOK
NOTEBOOK
HALL PASS
LESSON PLAN
EXAMINATION BOOKLET
ADVISOR

BEST COPY AVAILABLE

and evaluation of the hypermediated software. Such a framework will go beyond the guidelines used for computer-based instruction as we knew it a few years ago and if not able to provide succinct answers, will need to at least address additional areas of possibilities.

In the past, Knupfer (1995) has suggested guidelines for visual imagery within computer-based local and distance instruction that incorporate some of the well-established standards for instructional television production. Now, we must take that set of guidelines and extend it even further. In doing so, the following questions seem essential to any improvement of instructional design guidelines for interactive multimedia. Their answers help to develop a possible framework to guide future instructional designs for hypermediated learning:

- How should the visual elements of hypermedia be structured?
- What are the proper uses of visual metaphors?
- What are the formidable questions inherent in the presentation of the images? (e.g. text links per screen, images per screen, length of video vignettes)
- When does design supersede content?
- What is the importance of the instructional designer's familiarity with new models of instruction and learning theory?
- What theoretical elements are appropriate for the graphical-user interface:
- Are the images, language, and content free of cultural and gender bias?
- How do the images, language, and content accurately represent the cultural and gender variables?
- How should the visual elements be evaluated?
- How should formative and summative evaluation occur?

Although there are no answers that will work in all situations, for all audiences, there are some considerations that designers can incorporate into the planning process. As hypermedia takes fuller advantage of on-line resources it will be important for designers to consider strategies for handling dynamic information and images from outside resources, such as the Internet or World Wide Web (WWW). These outside resources can be essential to maintaining current information within the lessons. For example, a designer might link a lesson to a specific Internet site or database and display that information within the lesson screen. The thought of maintaining the integrity of a current multimedia lesson while incorporating information from the Internet could be daunting. Therefore, the following thoughts should be helpful when considering each question.

How should the visual elements of hypermedia be structured?

Visual imagery is one of the most important elements of hypermediated instruction, yet many designers fail to incorporate it to it fullest potential. If used wisely the visuals can greatly enhance the instructional message. Like other elements within the product design, visual information needs to be applied in a consistent manner yet with attention to a comfortable blend of variety and aesthetics. Both of the products evaluated for this study did an excellent job of applying visual elements to a certain extent, and both have areas in which they can be improved.

The greatest weakness of both products stemmed from the limited experience of certain key decision makers who lacked enough skill to visualize elements of the learning process. Having not been trained in instructional design, nor visual learning, nor graphic design, nor aesthetics of art and so on, some key leaders were greatly limited in their ability to imagine the potential of the visual messages within each product.

Certain weaknesses within each product, both in terms of adding time to the production and in the final visual message, were the direct result of decisions made by project leaders who did not understand how to take advantage of the medium to enhance learning, tried to save time by skipping steps in the design phase, and placed too much responsibility on programmers to provide design solutions toward the end of the development cycle. The complexity of reasons for these weaknesses are beyond the scope of this paper, but the resulting compromise in potential learning is most evident in certain mismatches between video imagery or graphics and the content or tone of the script.

There is no doubt that the single most important factor in the successful design and imagery used was the result of teamwork that drew on the talents of a variety of people. Communication among the design team was essential. Successful visualization within each of the products was the direct result of being able to work with a talented artist who was able to shape the ideas into visual form that carried meaning into the instructional process.

The visual elements that seem most important are those that comprise the basic structure of the image, add meaning to the message, and employ the power of visual impact when appropriate (Knupfer, 1994).

The structure of the image first considers the visual as a whole, then its components and the elements of good screen design. In order for the various image components to work together, elements of well-planned screen design must weave the components together in an aesthetically pleasing and understandable format. Thus, one must consider both the separate image components and the screen design.

Information becomes valuable as it takes on meaning for an individual. Since visuals are meant to aid in the discovery of meaning, it follows that well-designed visuals will help students interpret the meaning. Computer images vary widely in potential design and usage. Images can be static or dynamic, concrete or abstract, and they can change as a result of user interaction with the program. A learner's interpretation of the image can be affected by the text, type of graphic, and layout employed.

Computer graphics and appropriate screen displays lend power to communications by adding an image to the text. Visual images can aid message interpretation and enhance learning. They can also add power to the message by providing an emotional element that is beyond that of other communication strategies. Realism can be enhanced by providing a graphic component. Images can represent realistic data ranging from simple sketches or graphs to intricate displays or vividly emotional scenes. Virtual reality can even conjure up imaginary situations through artificial imagery.

Because computers display images from peripheral devices, it is possible to display still or dynamic photos of real events. These events and their results can combine with text and audio segments to provide a sense of realism to the user that otherwise would not be possible. For example, the ABC News videodisc provides real news footage that goes beyond newsroom reporting to provide visual displays of field events. Along with the understanding provided by the realism of these events, comes the potential to stir emotions for various reasons.

What are the proper uses of visual metaphors?

Metaphors are only as good as a situation allows. Metaphors can work well in a variety of situations, but in all cases must provide an appropriate match between the topic, the learners, and the way the metaphor is applied to the design. If learners cannot relate to the metaphor, then the instructional message will be lost. But if they can relate to the metaphor, then the instructional message can be enhanced.

Metaphors are used to some degree in both the social work and the teaching multimedia projects, but they are applied with differing intensities. The social work project incorporates a variety of limited metaphors into the modules, but does not place heavy emphasis on them. Further, it does not carry any one, single metaphor throughout the entire series other than in the overall functionality of the user interface. For example, the legal module was developed by different design team members and contains different metaphors than the stress module, yet the general functionality of the user interface remains consistent.

The metaphor within the teacher multimedia worked well with the student teachers for whom it was intended, but other learning audiences have reacted with confusion and frustration. Objections to the completely graphic interface arose because some learners could not relate to the school scenario, needed more preliminary interpretation of the graphical user interface, or preferred environments that were more text-based. General comments about desiring more text indicated some potential for confusion with interpreting the school metaphor as well as unclear functionality of each graphic. Learner who are willing to explore will probably feel more comfortable in this type of environment.

What are the formidable questions inherent in the presentation of the images?

The number of text links per screen can become quite dense, depending upon the situation at hand. If the user interface clearly creates a path for learners to follow that allows them to explore certain branches of information in depth, then designers need to weight the consequences of finding more information versus the potential of missing important points by being distracted. The number of links per screen certainly will depend upon the purpose of the instruction and the audience involved.

The balance of images per screen will not be determined by a precise definition, but will depend upon the purpose of the imagery, the balance of the screen design, and the functionality of the images. It is perhaps better to design one complex but integrated set of images as opposed to independent, cluttered, or conflicting images. In addition, the meaning of the images is important. All images should fulfill a specific purpose. That purpose might be to get attention, to enhance meaning, to add variety, and so on, but it clearly should not be simply to fill a blank space on the screen.

The length of the video vignettes was a topic of debate with both of the projects at hand. While the vignettes needed to be long enough to provide meaningful scenarios that portrayed information clearly, they need to be short enough to allow user interaction, practice, and feedback at appropriate places. Large amounts of video information can be incorporated as smaller video clips as long as there is a common thread that laces the information together.

When does design supersede content?

Some people might say *never*, but there are times when the design needs to supersede content. Courseware must show consistency within the user interface, so once a design standard is decided upon it must be maintained in a similar manner throughout the instruction. In addition, designers need to be aware of standards and common practices that have been incorporated into other software that the learners have used in the past. If learners expect the software to function in specific ways, then it is best to incorporate standard practices when possible so that learners can concentrate on the learning and not be confused by inconsistencies of functionality.

In a case where the instruction is designed as a series of modules, learners expect one module to function in a similar manner as another. Like a series of books in a set, learners expect certain consistencies within the look, feel, tone, instructional approach, and functionality of the courseware.

When content can be delivered in a variety of ways, design can determine final decisions about how content is delivered and how much detail is appropriate. Because hypertext allows hot links to be made, designers are not pressed to include all details about a subject within the main part of the courseware, but can use links to outside resources as necessary, thus enabling learners to choose more or less detail, depending on how much information they need about specific topics and how much time they can spend at the given moment.

Screen design enters into consideration as well. Good screen design allows adequate white space so that the eye has a resting place and incorporates imagery in a meaningful way. Rather than filling the screen with text, designers often need to reword and abbreviate text so that it fits well within the visual design of the screen and in so doing, need to consider grouping of words, phrases, and lists in the best way to enhance the mental processes. Substituting imagery for text can add power to the message.

What is the importance of the instructional designer's familiarity with new models of instruction and learning theory?

Design team members debated about whether the same instructional approach could be used for everyone who will use the courseware., If not, then how could the designers accommodated different learning styles within the courseware?

Like other types of instruction, hypermediated instruction can provide examples, practice exercises, and feedback that will use a variety of instructional styles and appeal to different styles of learning. As hypermedia becomes more sophisticated and gains capability of incorporating outside resources, designers can leave more discretion to user preferences.

Meanwhile, designers can do such things as provide more choices within the use interface. Those choices could allow learners to move in different paths through the material and incorporate more or less information into the lesson as needed. In addition, learners should not be forced to listen to audio or to read text verbatim at all times, but should be allowed choices to hear, read, or hear while reading text in specific situations within the learning. Thus learners can choose to receive information in a way that is most comfortable at a given time.

It will be important that designers break free of behaviorist models to the extent that the courseware does not rely completely on that approach. Hypermedia allows a much more creative approach to instruction than the drill and practice style of learning, so designers can incorporate more constructivist approaches to courseware design as desired and likewise employ behaviorism, guided learning, and on as appropriate.

What theoretical elements are appropriate for the graphical-user interface?

- Are situated-learning metaphors appropriate to the audience and the content? If so, what situations are suggested or accommodated?

- How is learning constructed? What design elements related to learning theory are evident within the courseware? Is there evidence of learner control and autonomy, or is the program designed in a more behavioristic, directed structure?

- Guided learning? What evidence is there of motivating learners and attending to various learning theories? Is learning guided in a systematic way, a tightly controlled way, not at all, or something in between? Does there seem to be a match between the courseware's purpose, the audience, skill level, and instructional approach? How does the system work together as a whole?

Are the images, language, and content free of cultural and gender bias?

Media often portrays people in stereotypical roles. Movies, television programs, advertising, books, and now even clip art are fraught with stereotypes based upon cultural background, race, and gender. As courseware developers think about designing, scanning, or downloading images into the courseware, they should consider what messages are implied by the images.

Are the men portrayed in leadership positions, while the women appear in subordinate roles? Are men portrayed in work situations or using technology, while women are portrayed in nurturing roles? Are women portrayed as either older and overly-grandmotherly, or young and overly-sexy?

Are colors and tone used to add feeling or draw attention to an image in a suggestive way that might bias the learners? Examples of this are the darkening of O. J. Simpson's face on the cover of Time magazine (1994) and the bright red coloration applied to the woman figure's nipples in an otherwise dark and muted image depicting a male and female within a recent New York Times (1996) report on cancer? The former suggests a guilty verdict prior to the trial while the latter continues the American male fixation on women's breasts as sexual objects, even within an article focused on medical education.

Do sports analogies or competition appeal more to males than females. Are cultural groups represented in true proportions and in accurate situations with the examples, imagery, and prerequisite knowledge necessary for successful completion?

How do the images, language, and content accurately represent the cultural and gender variables?

This question goes deeper into the underlying messages portrayed through the images, language, and content. Rather than simply avoiding stereotypes, it is important to keep the messages in proper context in terms of culture and gender. For example, does the design go the extra step to consider and include examples from the cultural group that the courseware will be used with? Certain examples will make better sense if the learners can relate to them.

Messages intended to influence attitudes toward using birth control and planned parenting, need to consider the cultural underpinnings of such issues as within the learning group. In cultures where a people's status is influenced by the number or gender of their of children, any attempt to curb birth rates would need a very sensitive approach. Likewise, portraying value systems of rural American within inner city schools and vice versa, could make the instruction fall flat.

Icons and symbology can be problematic. While some icons and symbols are interpreted with similar meanings, others will take on different meanings within different international audiences. A dragon, for example, is thought of as a scary and evil presence in Western culture, while it is believed to be powerful and even protective in Eastern cultures.

How should the visual elements be evaluated?

Imagery created with computers can be simple or complex and it can be altered within the computer environment so that the basic visual elements such as line, space, shape, form, texture, color and so on can take on different characteristics than within other media. There are a host of questions that must be asked about how imagery is used within hypermedia..

For example, what type of look and feel should be used in hyper-mediated learning environments? How can the imagery enhance or detract form the learning process? Are there certain ways to display information that work better in hypermedia than in other media? If so, how should designers modify images to best present them on the computer?

How much contrast is just enough, but not too much, to make the image legible and achieve the necessary effect? Can the same guidelines be followed as for projected images or broadcast images? If not, what are the differences and why are those differences important? If the images will be drawn from different sources into the hypermedia, are there any standards that one should look for in order to provide pleasing and meaningful images for the learners?

Is the imagery appropriate to content? Are visual images linked logically with other images and text? If the images change, do they do so with any consistency or real purpose? How are images positioned within the user interface? The specific situation in which the media will be used will determine the final answers to most of these questions. The age and sophistication of the learner, the likelihood of drawing from mixed sources, the technical capabilities of the equipment, and the topic at hand will certainly all affect the answers to these questions.

How should formative and summative evaluation occur?

- What questions regarding visually literate learners are appropriate in formative and summative evaluations:
  - learner understanding of the importance of the image or video to the content?
  - learner ability to "read" the image or video in context with the text and other elements in the GUI?
  - acceptance level and comfort with the GUI?

As the technology becomes more sophisticated, it will be possible to incorporate images and text form the World Wide Web into our classes. It will be important to use knowledge gained from experience as well as the answers to some of these formidable questions as we develop computer-based or multimediated instruction that seeks innovative uses of the Internet.

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Creating Web Pages: Is Anyone Considering Visual Literacy?

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Abstract

This study examines educational and non-educational WWW web pages that exhibit an understanding of visual literacy principles. The study also examines on-line and printed materials that show how to construct web pages. It uses this paradigm to analyze these web pages and printed materials, for qualities that exhibits good design elements from pages that exhibit weak design. It concludes with a recommendation for further research to quantify the qualities that were found.

Introduction

A revolution is taking place -- a digital revolution and the "most crucial task before us is not putting in place the digital plumbing of broadband communications links... but rather one of imagining and creating digitally mediated environments for the kinds of lives we want to lead and the sorts of communities we want to have." (Mitchell, 1996, p. 5). One alteration of this revolution is the digital environment of the graphical user interface (GUI). This environment, once static and linear, has changed. Users relate mutually to screens that are visual, interactive and non-linear (Jones, 1995). Another transformation is the manipulation of images. Electronic tools allow the user to capture, display, distort, enhance, store and print images. These "developing technologies... blur distinctions between actual and represented reality..." (Stieglitz, 1995, p 22).

The Internet, a global network linking millions of people world wide, is a digitally-mediated environment. The Internet is made easily accessible through World Wide Web (WWW) browsers. These interactive browsers, i.e., Netscape, Internet Explorer, Mosaic, include informational displays and access tools presented to users in the form of web pages. These pages, created in a computer language called HTML (Hypertext Markup Language) contain hyperlinks -- graphics, buttons, icons, images, colored text, animation, video -- that allow the users to browse the contents of the page, search and retrieve information, and link to other web pages around the world. Recent developments in on-line communication tools provide the ordinary user the ability to create interactive pages and offer course delivery on the WWW. "The technology to transfer and transmit graphic and other forms of visual communication instantaneously around the globe has made available for communication, a large audience, which is often visually illiterate" (Saunders, 1994, p 186).

Purpose

The purpose of the study was twofold: (1) to look at the design, aesthetics, and functionality of educational and non-educational web pages from the perspective of visual literacy and, (2) to evaluate printed and on-line materials that are used as resources by professionals and nonprofessionals to create these web pages. These "how to" manuals were evaluated for their discussion of good screen design, the use of graphics and icons as communication, backgrounds, hypertext, linking, and overall understanding of publishing on the WWW.

The web pages were divided into major categories and sub-categories. The educational categories included K-12 schools and colleges/universities. The non-educational categories included commercial, publications and communications, informational and cultural, and personal web pages.

The subject of images, graphics, and icons is critical. From a technical aspect, if an image is memory intensive and being viewed with a low speed modem or limited machine capacity, the images load slowly. In creating web pages, the designer must convey to the user ways to access hyperlinks. This is sometimes done through icons, images, or text that act as interactive buttons. When the user clicks on these hyperlinks they are connected to new information, other web sites, or further resources. To be interactive the buttons must be properly coded in HTML, thus, guiding the user.

The "business of creating web sites" is rampant. Many services, both on-line and printed references offer "how to" construction of web pages. However, little thought is given to the overall image of the page. Usually the focus is on the HTML language.

Background

The explosion of the WWW as an informational tool on the Internet (Descy, 1994) provides students and teachers, at all levels of education, with up-to-date information and continuous access to resources world wide. In effect, the Internet is a virtual library of information (Doyle, June, 1994).

Most recently, the development of electronic utilities provided through WWW links, growth of software that contains HTML readers, and publishing of on-line and printed technical manuals have provided ordinary computer users with the ability to easily access, create, and publish web pages. In particular, K-12 educators have begun to create web pages as a way to provide information about their schools and classrooms, display student work, provide links for student-generated research, and link with other schools to allow students to collaborate with one another in learning activities i.e., creative writing and problem solving.

Colleges and universities also use web pages as marketing strategies to provide information about the programs and courses they offer, as a way for students to apply to these programs or to register for courses. In addition, web pages are being created by college and university professors to offer courses via the WWW.

The increased ability to create web pages that use graphics, icons, and images to communicate a problem comes at a time when "our educational systems have reduced the number of courses in art education and.... the availability of courses in visual literacy that would advance seeing and interpreting what is seen are only recently finding support in the educational system" (Saunders, 1994, p 187). Thus, many educators and students creating web pages have had little guidance concerning the visual design elements. The myriad of technical manuals provide information about how to create web pages but they don't specifically address the necessary design elements that will help the web page communicate clearly and appear aesthetically pleasing.

Visual design is a significant factor in the development of web pages. The "...visual medium is...superior because it offers structural equivalents to....objects, events, relations and visual elements that can be "organized according to readily definable patterns." (Arnheim, 1969, p. 232) Visual representations in the form of icons, graphics, and images are defined in two- and three-dimensional space as compared to the one-dimensional space of text (1969). According to Saunders (1994, p. 186-187), these visual representations (graphics) function as a communication tool because they are:

- based on things that are seen
- appeal to our emotions as well as intellect
- convey a single overwhelming meaning or message
- communicate information
- comprise a language and grammar of which most of us are ignorant
- are not designed to encourage feedback from the audience

Effective web pages contain good screen design, graphics, icons, background images, image maps, and hypertext. The construction of web pages involves an understanding of the use of these elements. This understanding is inherent in the aesthetic and technical function of informational and form design as well as graphical user interfaces.

"Good screen design uses the visual to portray the message to the reader." Text with white space, the position of graphics, mixture of text and graphics, consistent placement of navigational buttons, standard icons, and borders act as visual aids to the user (Knupfer, 1994, p. 216).

Graphics are used to make visual statements -- to communicate visually. Visual statements are "an object or collection of objects created or assembled for the purpose of being seen and experienced" (Curtiss, 1987, p. 4). Visual statements contain visual symbols that include shape, color, dot, line, and style. (Such statements also include form -- the expressed ideas and conveyed meanings behind the elements that give support to the communication of the visual statement (Seels, 1994). To effectively communicate with visuals, creators of web pages must consider the simplicity and clarity of the images, balance, harmony and organization of the text and images, aspects of framing, and emphasis color, texture, and space. (Thompson, 1994).

Icons to serve as "reference points....for searching and retrieving information" (Ma, 1995, p. 33). Icons also can be used as signs. Signs are "...organized into systems of meanings or codes" (Muffoletto, 1994). Signs can also be influenced by social and cultural meanings. Ma (1994) studied the meanings of icons on the WWW pages of 150 United States libraries. A sample of icons Ma found included an icon depicting a web overlaid with a magnifying glass to depict Internet resources, book-shaped icons that represent on-line catalogs, periodicals, etc., and icons that portray a highway to catalog Internet resources. Semiotic analysis of icons indicated that familiar icons used to index traditional library resources were being used to index resources indicative to the resources on the WWW

Backgrounds and background images are important design components. Used appropriately, background images can enhance the foreground icons, graphics, and text. Many novice designers include these images to "add a theme...or because they fill up unused space" (Siegel, 1996, p. 131).

Image maps (complex images that produce multiple hyperlinks) contain visual, navigational, and practical characteristics. Visual characteristics are clues that are recognized by the viewer and meet the viewer's expectations pertinent to the information. Navigational characteristics include the viewer recognition and initiation of linked information being used to index resources indicative to the resources on the WWW.

Practical characteristics include technical aspects such as image load time, background and special effects not cluttering the vision of the viewer, and whether graphics fit the target audience (Cochenour, Lee, and Wilkins, 1995). Cochenour and others (1995) evaluated nine WWW sites that contained image maps for visual, navigational, and practical characteristics. Nine viewers evaluated the sites and "they seemed to judge the degree of appeal by how easily they could get to information" (p. 170). The web sites receiving the highest ranks contained simple images and a well-ordered layout with clearly defined hot spots and a limited number of choices. Hypertext links are critical to web page design. These links are words or phrases that are underlined and colored to denote a link to more information or other web sites. The conventional use of color displays the "unvisited" links as blue and the "visited" links as purple.

This study investigated the use of these design elements in software and printed materials that tell how to create web pages and in the web pages created by students and teachers in elementary, middle, and high schools as well as those in colleges and universities.

Methodology

For this research the web sites were categorized into two main groups, educational and noneducational. Then each of those larger categories were further subdivided. Figure 1 shows the organization of the educational web page site categories and Figure 2 shows the organization of the non-educational web page site categories.

Development of Evaluation Instrument

Considering there is no previous research about designing web pages from the perspective of visual literacy, the researchers began by examining the literature for checklists that related to the basic elements of visual statements, GUI design, hypermedia design, and publishing on the WWW (Curtiss, 1987; Lucas, 1991; Schwier, 1991; Cates, 1992; Tolhurst, 1992; Wiggins, 1995). From these checklists two evaluation instruments were

Figure 1
Educational Web Site Categories

[illegible]

- **Elemenentary School**
  - **Student, Teacher, School**
- **Middle School**
  - **Student, Teacher, School**
- **High School**
  - **Student, Teacher, School**
- **College or University**
  - **Student, Teacher, School**

Figure 2
Non-Educational Web Site Categories

- **Commercial**
  - **Company Information about Products**
  - **Product Instruction -- how to Use**
  - **Advertising**
- **Publications / Communications**
  - **Newspapers /Magazines**
  - **Radio / TV**
  - **Journals / Books**
- **Informational / Cultural**
  - **Museum / Library**
  - **Community**
  - **Special Interest**
- **Personal**
  - **Professional**
  - **Family**
  - **Introduction**

developed and refined based upon a six-point Likert-type scale. One instrument contained 21 questions for evaluating on-line and printed resource materials. Examples of the evaluation criteria in this instrument are:

- Contains introductory information about the general WWW environment
- Use of browsers
- Explanations of image formats (tiff, pict, jpeg, gif, etc.)
- Use of color
- Links
- Publishing on the WWW
- Examples provided
- Emerging trends

A second evaluation instrument contained 57 questions that were embedded in the categories: design, graphics, text, and color. These categories were divided into aesthetics and functionality. These questions were used for evaluating K-12 schools, and college/university web sites. This instrument was also used to evaluate informational and cultural as well as personal pages. A sample of the evaluation criteria include:

Design -- aesthetics

- Design elements are aesthetically consistent (consistent headers, background, font sizes, etc.).
- The page has appropriate white space.
- The background contributes to the overall design.

Design -- functionality

- The design appears to be created for lay computer users not experts.
- The message is clear.
- The message is concise.
- The site appears to be current.
- A text only option is available when large graphics load slowly.
- The links function properly.
- Graphics load with reasonable speed.

Graphics -- aesthetics

- The graphics do not distract the user from the main message of the page.
- The graphics that are intended to be buttons look like buttons (easily recognizable as buttons)
- The graphics that are not intended to be buttons do not look like buttons (you do not do false clicks hoping to go somewhere).
- Graphics are easily interpreted.

Graphics -- functionality

- The site uses appropriate thumbnail graphics (user doesn't need to use time and memory loading in memory intensive graphics).
- Graphics enhance the message of the page.

Text -- aesthetics

- The properties of the text (font, style, size, color, pattern, etc.) are aesthetically appealing.
- The color of the text is aesthetically compatible with other design elements on the page.
- The layout of the text is aesthetically pleasing.

Text -- functionality

- The color of the text does not distract the user from the main message of the page.
- The layout of the text does not distract the user from the main message of the page.

Color -- aesthetics

- Color changes are used to convey a message (visited links, happy-sad, day-night, timed elapsed, etc.)

- The design makes use of warm (red, orange, yellow) and cool (purple, blue, green) colors.

Color -- functionality

- The design of colors considers the age of the final user.
- The color scheme is appropriate for color-blind users.
- The background color is aesthetically pleasing.

WWW Site Selection

Sites were randomly selected from the web. Various descriptors, such as, creating web pages, HTML, web page design, and so on, were used in various search engines to illicit web sites containing resources about how to create web pages.

An initial list of publishers who produce information about how to design and create web pages was constructed based upon a search of on-line, bookstore, and library materials. Over 100 electronic sites and 25 printed manuals were evaluated. The web page sampling source for schools and colleges/universities was gathered from the Yahoo search engine using the education category. Twenty sites were randomly selected for each elementary, middle school, high school, college and university (n = 160). The K-12 web sites included both public and private United States schools. Higher education sites included public/private colleges and universities in the United States and four countries around the world.

Independent Evaluators

Four graduate students majoring in educational technology at a major mid-western university evaluated the commercial, informational, cultural, on-line and printed materials, and personal web sites. K-12 school and college/university web sites were evaluated by an associate and an assistant professor of educational technology. Both professors teach the use of the Internet and the WWW to graduate students.

Results

Initial data analysis of graphics, text, color, and design characteristics within the components of aesthetics and functionality indicates a wide range of quality in all the sites. The commercial sites developed by professionals contained animations and sophisticated graphics which met the criteria for evaluation but they tended to target a narrow group of people. For example, product information sites can be very technical and difficult for the common user to understand. An example is the *About Abbey Camera* (http://abbeycamera.com/) web page. This site is targeted for general audiences but the navigational icons are not consistent and tend to mislead the user as to their use.

Some of the web pages are well designed and meet the needs of the general user. Examples of such sites are the *JC Penney's* and the *Ben and Jerry's Ice Cream* sites (see the sites at http://www.jcpenney.com/ and http://www.benjerry.com). The meaning and the matching of the text and the images are consistent and appropriate for general adult users. *Federal Express* (http://fedex.com/), *Land's End* (http://www.landsend.com/ are examples of sites that target specific users. These sites contain icons and links that guide users who want to find shipping information, ship parcels or order items. The icons are understandable and link to pertinent information about shipping parcels and other aspects of the each companies' business.

Evaluation of the printed and on-line materials indicates a strong agreement in the use of how to create in HTML language and the technical aspects of using specific image formats (gif, tiff, jpeg, mpeg) for WWW publishing. Examples of these printed and on-line publications include:

Fry, A. and Paul, D. (1995). *How to publish on the internet.* New York, NY: Warner Books;

Danesh, A. (1996). *Teach yourself web page design.* Indianapolis, IN: Sams.net Publishing

Home page creator [On-line]. www.angelfire.com/freepages/create.html

Netamorphix [On-line]. http://trace.wisc.edu/TEXT/GUIDELNS/HTMLGIDE/htmlfull.html

Lynch, P. (1995). *Yale C/AIM WWW style manual* [On-line]. http: //info.med. yale. edu/ caim/ printinfo. html

Niederst, J. & Freedman, E. (1996). *Designing for the web: Getting started in a new medium*. Sabastopol, CA : O'Riley 7 Associates, Inc..

Rogers, S. & Wise, A. (1996). *Home page beautiful*. Radiant Productions. [On-line]. http://click.com.av/click/v03/deconstruction/index.html

Wilson, S. (1995). World wide web design guide: Learn to design professional web pages . Indianapolis, IN: Hayden Books.

However, there is little agreement on the inclusion of elements of good screen design, appropriate size of graphics, use of icons for navigational purposes, and designing the screen as a portrait. (That is, the message is the object and the portrait is the screen.) Still, there are exceptions in both print and on-line publications. The authors discussed the use and aesthetics of images, backgrounds, text, graphics functionality and emerging trends. The user is provided with examples in the printed publication that correlate to examples in the on-line publications. These include:

Horton, W., Taylor, L., Ianacio, A. & Hoft, N. (1996). *The web page design cookbook: All the ingredients you need to create 5 star web pages*. New York, NY: John Wiley & Sons, Inc.

Horton, W. (1966). *Illustrating computer documentation*. New York, NY: John Wiley & Sons, Inc.

Siegel, D. (1996). *Creating Killer Web Sites*. Indianapolis, IN: Hayden Books. [On-line] http://www.killersites.com.

Evaluation of school sites indicates a strong use of backgrounds that tend to distract from the overall message. School sites tend to use text rather than images to present information. They use text whose properties (color, font, style, size) are difficult to read because the background interferes. Also, they use text that is targeted for adult users rather than the age of students attending these schools. Examples of these sites include:

Bethesda-Chevy Chase High School [On-line]. www.mcps.k12.md.us/schools/bcchs/

Chaffee Elementary School [On-line]. www.traveller.com/~lpearce/Chaffee/Chaffee.html

Fall Brook Union High School [On-line]. sd.znet.com/~schester/FUHS/index.html

Hardyston Township Elementary School [On-line]. www.garden.net/users/hardyston/non-enhanced.html

Longfellow Elementary School [On-line] www.nothinbut.net/~dhannah/xlongfel.html

Orange Grove Elementary School [On-line] www. awod. com/ gallery/ rwav/ oge/

Quail Run Elementary School [On-line] www. sped. ukans. edu/ ~scottk/ qr/

Examples of K-12 schools whose web sites contain good screen design, graphics that are aesthetically and functionally appropriate include:

Brookfield Central High School [On-line]. www. axisnet. net/ ~bchs/

Burke, Harry A. High School [On-line]. www. esu19. k12. ne. us/burke/BHS.html

Kyerene Akimel A-Al Middle School [On-line]. 204.17.16.101/Akimel/ams.html

Robinson, Andrew Elementary School [On-line]. www. rockets. org/

A further analysis of school sites indicates that the functions of graphics are not always apparent. Graphics which were not intended to be buttons looked like buttons, thus confusing the user.

Whereas K-12 schools use web sites as a way of introducing themselves to the WWW and promoting their school community, colleges and universities use their web sites for a variety of purposes, i.e., new student application, on-line registration, promotion, on-line courses, announcements, faculty and student homepages. Data for colleges and universities indicates a strong agreement in the areas of good screen design, use of color, white space, and icons that are effective navigational tools. Examples include:

Arizona State University [On-line]. www.asu.edu/asuweb/

College of the Menominee Nation[On-line] www.menominee.com/

Design functionality data regarding the updating of information, clues that reflect the information size, or provide a text only option when memory-intensive graphics are present indicates strong disagreement among all many K-12 schools and colleges and university web sites. However, many commercial, personal, and educational web pages contain indications of last update, informational size or provide a text option.

Conclusions

1. Preliminary data analysis indicates that the majority of the web pages use a simple design, with the standard blue and purple colors used for unvisited and visited sites.
2. Few web pages contained clues that would indicate the size of the files in the site.
3. The majority of web page backgrounds used distracting patterns and/or color.
4. In many cases the designers seemed to forget to maintain message of the page.
5. There was a tendency in most of the personal pages not to indicate the path the user is following. The user should be able to tell where he or she came from, how to go back and find his or her way around.
6. Many sites did not indicate whether the site had been updated. This may lead the user to loose interest in the site.
7. In many cases, graphics that looked like buttons were not.
8. The use of thumbnail graphics was minimal.

Recommendaations

The next phase of this study is to perform an in-depth data analysis. Following that, a formal evaluation of the data should be completed. From a preliminary analysis, the following considerations merit investigation:

1. Should the elements of the visual arts, dot, line, color, text that have been standard for decades apply to the medium of on-line publications?
2. Which literary publicatioon conventions should or should not be applied to the unique environment of web pages?
3. In what ways do the questions of interactivity, connection and interconnections, user control, and expeditious information gathering contribute to new publishing conventions?
4. How does the relationship of not knowing how a publication is structured impact the ability to communicate?

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Visualizing Instructional Design: The Potential of Dynamic Computer Presentations

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Abstract

Four development projects are described in this paper. Each represents a different approach to developing visually rich and interactive computer-based materials that are expected to enhance student understanding of the instructional design process. The projects described in this paper represent a series of steps taken to develop visual learning materials that are expected to enhance student understanding of the subject matter within a limited amount of time.

Graduate students often have difficulty understanding the concepts behind the various models of instructional design (ID). As a result, they spend excessive time debating and trying to understand how to interpret the various ID models. Although it is important that students reflect upon and discuss the various similarities and differences in the models, it is more important that they do so within the clear direction that is afforded by a solid framework of understanding. In order to help students in an introductory ID course come to a better understanding of the similarities and differences between various instructional models, the models were developed into dynamic computer graphics to use within a class setting. These graphics can be used by the instructor as a presentation aid or by individual students.

Since many of the students who enroll in the ID course are working professionals from rural areas, the only time they are able to come to campus is during class time, one evening per week. In addition, many students take two evening classes on the same night, so their minds are not free to reflect upon the readings or class material for extended periods immediately before and after class. Because of this situation, it is very important for the students to reach a solid understanding of the basic concepts during a brief time on campus. The projects described in this paper represent a series of steps taken to develop visual learning materials that are expected to enhance student understanding of the subject matter within the limited amount of class time available.

The Development Team

All of the authors involved in this multimedia development project had completed a basic ID course and were enrolled in an interactive systems design course. This project was assigned as part of the course work for the interactive systems design course.

The elusive problem that plagued the class was the lack of proper access to development software. Only one computer was available with either Macromedia Director or Astound, so the students needed to share.

The first three projects were developed using Director and the fourth project was developed using Astound, due to perceived time constraints of learning Director. There is no doubt that Director allowed greater flexibility of development and also utilization.

While designing the presentations, particular attention was given to the impact of visuals on learning. The development team carefully considered the elements of good screen design, concept mapping, cognition, and the paradigm shift from behaviorism to constructivism within the educational technology field.

Focus Questions

Four projects are described in this paper. The paper will discuss each project separately but within the same unifying set of questions as follows:

1. Topic Selection
    - Why did you choose this topic?
    - Why is it important to ID?
    - Why did you think this topic would benefit by adding visual information?
2. Design Features
    - Describe the design features of your project.
    - How is information organized in a visual format to help cognition?
3. Lessons Learned
    - What did you learn from doing this project?

4. Suggestions for Improvement
   - What recommendations would you suggest to improve your project?
   - How would this project best be used?
   - How could you test this project to see if it really works better for learning about ID than reading text from a book?

Project One -- Concept Clarity

The first project was developed strictly as lecture support. It was meant to be used to help students organize information within their minds according to logical chunks of information that students had read about and that were explained by the instructor. The intent was to provide the basic concepts of the ID process. This project could be used by students after the lecture for review, or if they had missed class. The amount of information within the project is skeletal and therefore, it depends upon supplemental information provided by the instructor or by the course readings.

Topic Selection

This topic was selected as the starting place because it gave the foundational underpinnings necessary to learn more about ID. The book explanation seemed to fall short of students' needs; students could not seem to read the information and understand it and remember it well enough to apply it consistently to class projects. Visual information would provide the students with cues to help remember the basic concepts of ID.

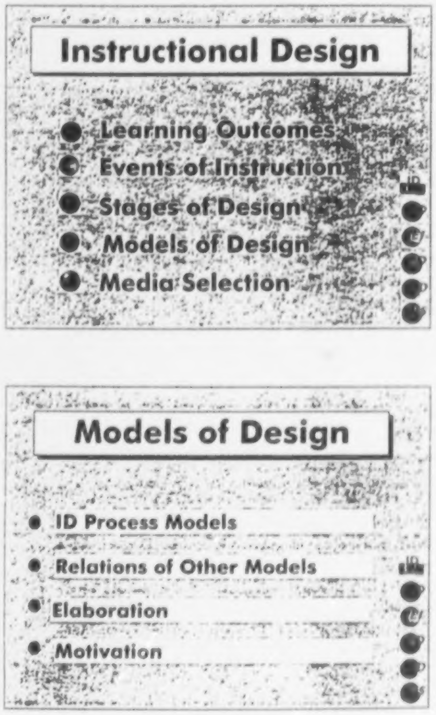
Design Features

The design features used within this project began with basic organization of information into logical chunks that were related and consistent with common ID course content. It was important that the material be designed for the greatest amount of flexibility for lecture support. The instructor wanted to be able to begin and leave off with any of the major concepts as necessary to support the lecture, which could vary depending on students' needs. Also, if students wanted to see part of the material again or the instructor wanted to compare or contrast information, then the material needed to be flexible enough to allow moving forward and backward as well as skipping around.

This project used muted or neutral colors in the background with a soft overall pattern that provided texture without interfering with the text. The text itself was presented in a contrasting colors, using a complementary color scheme. Titles, main information, sub categories, and sectioning of the screen were accomplished with color coding, layout, and font appearance so that the learners could easily keep track of their placement within the program.

Four basic screen designs were used to signify the type of information that was presented, thus learners would know what to expect based upon the visual layout of the screen. For an example of a main and a subordinate screen from Project One, see Figure 1.

Figure 1
Project One Main and Subordinate Screen



Instructional Design

- Learning Outcomes
- Events of Instruction
- Stages of Design
- Models of Design
- Media Selection

Models of Design

- ID Process Models
- Relations of Other Models
- Elaboration
- Motivation

Lessons Learned

This project was fun to do and it was a start in the right direction. In addition to lecture support, it could be used by individual students if they missed class. The project taught us that logical visual layout of information can help students to understand complex concepts.

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Suggestions for Improvement

Although an instructor could easily maneuver around the software, we believed that students who might use it after missing class could become lost or not see the visual links between some of the more subtle color changes in the fonts. To help clarify the visual relationships within this presentation, additional color coding was added in the form of bullets. This was a good addition in terms of conceptual relationships, but there needs to be further refinement of the size and placement of the bullets, as well as clarification of the accompanying color key.

The color key will need to be made smaller so that it can fit as a template on all screens without crowding the screen or otherwise interfering with existing content. We are also experimenting with button size. Right now, the buttons on the main screens are larger than the buttons on the subordinate screens, but we are not sure if the size is distinctive enough to serve effectively as a cue. It would be a good idea to use the smaller button size for aesthetic purposes and add a texture to the buttons as an addition cue. The existing colors on the buttons are distinctive, however, some people might have special needs related to color vision and large screen projections systems often seem to distort colors beyond recognition.

Project Two -- Color Coding

This project emphasized color coding overlays to enhance the standard ID process model, known as ADDIE. The ADDIE model moves through a process of:

- Analysis
- Design
- Development
- Implementation
- Evaluation

Close inspection of the ADDIE process and its relationship to a variety of ID models, revealed that the implementation process was usually skipped over within the models. This was not apparent at first and as a result, it was a confusing point for students.

Topic Selection

While taking the introductory ID class, several students had difficulty understanding the difference between the functionality of different ID models. The textbook presented a variety of models, and although the models were diagrammed in black and white, they were difficult to understand. The book could be improved by applying one or more of the models being discussed. The first thing to analyze was the presentation of the models themselves in a circular attempt to improve their presentation.

The importance of understanding the similarities and differences among some ID models in an introductory ID class is obvious. With a rock solid understanding of what the different models emphasize, a student should be able to gain confidence in selecting or modifying a model to use in developing good instructional materials.

Multimedia computers offer instructional designers different way of applying certain instructional cues. The use of color, sound, images, and even motion are now much more economically feasible than they are in a printed textbook. Color seems to be an obvious is element of visual design, so we thought about how it could be used in this context. For most people, color is a very strong organizing cue. For example, in highway signs greens and blues can safely be ignored; yellows and reds cannot. Or consider a man who enters a restroom with pink walls; he is likely to stop and make sure that he is in the right place.

In this example, we use color to classify and compare ID models to the basic ADDIE process, but we added a sixth component "R" to represent the need to revise, thus making the acronym, ADDIER. ADDIER is the basic model for all kinds of design processes. By relating ADDIER to other models in a very clear yet unobtrusive way, we believe that future ID students will learn about ID better than they otherwise would.

Design Features

We called this project *Investigating Instructional Design Models* and its goals was to help students understand the basic principles of six major models for designing instruction. Those models are typically addressed in instructional design textbooks as IDI, Air Force, Dick and Carey, Gagne and Briggs, Kemp, and Seels and Glasgow. Although there are many ID models, these were chosen as basic ones. These models were to be presented as variations of the basic applied design process model, ADDIE, which is presented as an introduction to ID principles.

The program is based on a simulation called *Learning Unlimited*, which is a video clip developed by an ID consulting firm. Learners take on the roles of "apprentice designers" who must attend the firm's design orientation program, called *Meet ADDIE*. Following this orientation, the learners work as a member of their selected client's ID team. During the course of the program the apprentice designers could work with the six different models. But, they must choose two design models from which they will create instructional packages.

The presentation of the instructional ID models was done in Macromedia Director, enabling an easy combination of text, graphics and color. The user can select which ID models to look at by clicking on hyperlink objects, similar to the hypertext of web pages.

The ID models under study are depicted with a mixture of graphics and text, similar to a flow chart. One model is presented on each page and compared to the ADDIER model. That is, the page is split vertically, with the more compact ADDIER on the left and the model under study on the right.

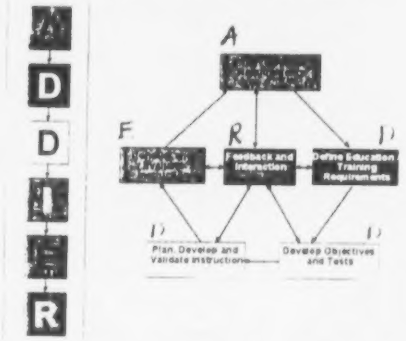
Each step of the ADDIER model was assigned a background color. The primary purpose of the steps in the target model were determined and their backgrounds were filled in with the corresponding color from ADDIER. Since ADDIER is such a cognitively simple applied process, it provides a firm anchor for analyzing, comparing and contrasting, the other models. By providing context, it allows users to construct their own mental models using the more complex ID models.

Figure 2 shows the ADDIER model with its color coding represented in shades of gray. "A" is cyan, the first "D" is royal blue, the second "D" is vivid yellow, the E is hot pink, and the "R" is red. The "I" is missing form the right side of the image and that would be immediately noticeable because of the presence of green on the left side and the absence of green on the right.

Lessons Learned

The immediate reaction was how much clarity such a simple thing as adding background colors could make. The best example was one of the models which did not have any sort of implementation step. In a totally unscientific survey, we asked about a dozen people to look at this page and comment upon it. With little or no prodding, every single person but one pointed out that a color was missing from the model on the right. It is interesting to note that the one exception had a fair amount of ID experience and was probably looking at the model from a different viewpoint than the beginners.

Figure 2
Project Two ADDIER Model


D
D
R
A
F
R
D
Feedback and Interaction
Define Education Training Requirements
D
D
Plan, Develop and Validate Instruction
Develop Objectives and Tests

The absence of the color immediately focused people's attention. By starting to build a mental structure before the user has to think about the words being used, we expect that the resulting structure will be more nearly correct than would otherwise be the case.

A second example of what was learned through this project was the process of mapping the flow of how the program worked. By fitting various ID models into a similar flow or process of learning, it required us to look at the similarities and differences of each model in great detail.

Suggestions for Improvement

Starting to improve this project is simple. First, finish it. The result of the class project provided a good beginning to developing a course curriculum on ID models. Currently, it corresponds to a single chapter from one ID textbook. Adding four or five more chapters to create a semester course content would make it viable.

Having this be the introductory text for ID course would be its best use. Its strength lies in its simplicity. This allows the user to start constructing mental models of ID without the complexity associated with most texts. By starting at the beginning, relating ID to the everyday approach of ADDIER, the details of the different ID models are

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connected to something already within the students' frame of reference. This association will foster a more thorough understanding of what goes into the ID process.

Instructional design is a cognitive course that should result in thorough development of certain skills. Any knowledge obtained is useless without a demonstration of the skills learned. By reducing the amount of time spent on learning ID models, more time can be devoted to actually creating instructional material. Since this project's goal is a more concise, hence a shorter instructional period, it should result in less time spent learning about the larger range of ID models.

To determine whether or not this approach is better, a comparative study of subjects using it versus those who don't can be conducted. The criteria for deciding if this approach is better is two part and fairly simple. The first criterion is the quality of the students instructional projects. While somewhat subjective, most ID instructors have opinions on what is good and what is not. In this case, their opinions should count. The other criterion is the students assessment of what they did. To a certain degree, how they judge their own projects should demonstrate how well they understand why they did what they did.

Project Three -- Aesthetics

This project concentrated on developing the overall visual aesthetics of the interactive instruction. It employed a dual colored, graduated background, screen partitioning, and several unique design features such as two way sliders for learners to control window views. Metaphors were employed with care so that the imagery fit well within the overall aesthetic appeal.

Topic Selection

We selected an overview of the ID process as an appropriate topic because the generic ID model benchmarks that were elaborated in the project would necessarily guide the project team's decision making. Furthermore, the overview provides a mental map that prompts or aids the user in making connections and predictions. The scope of available resources - time, knowledge base, software, and hardware availability - also informed that decision.

Sophisticated ID models are diverse and complex yet universally insistent upon the following steps which may be acknowledged specifically or as integrated components: analysis, design, development, implementation and evaluation. These benchmarks provide direction for thought and action toward specific, measurable, instructional outcomes be they cognitive, behavioral or psychomotor.

Textbooks used and referenced in the ID class are wanting of clear organization and portrayal of the general ID process. Visuals, infrequently placed in close proximity to associated text in traditional textbook formats, were often confounding rather than helpful. Furthermore, because the visuals are static, too much information is revealed too early in the instructional sequence.

An alternative approach to information sequencing is evident in texts attempting to emulate the unfolding of a hypermedia document. Nevertheless, these were judged a poor approximation in that the visual maps indicating location within the model occurred only at the beginning of sections necessitating page skipping in order to place the textual information within the overall model. Text-based maps may be helpful but could be omitted in favor of the simplicity offered by concise thumbnail maps repeated at the upper left corner of every other page. In either case, the texts were poor models of ID process in general.

Design Features

This project provides a map for thought and action relevant to the Problem Analysis phase of ID. The design permits the learner to tailor, within predetermined limits, the sequence, linear or non-linear, according to prior experience with ID and individual preferences. For instance, the *Tour* option presents information in a step-by-step sequence, with the option to *Quit* at any point. Students already familiar with problem analysis as a component of ID may opt for the non-linear approach by using the overview screen's ID model which serves as a main menu (see Figure 3). Throughout, students have the option to quit or return to the main menu.

Evaluation is integrated into the sequence by way of check point question screens. Questions are intended to invite reflection and review. An Answer field is readily available upon a *Click* request from within the bounds of a question's text field.

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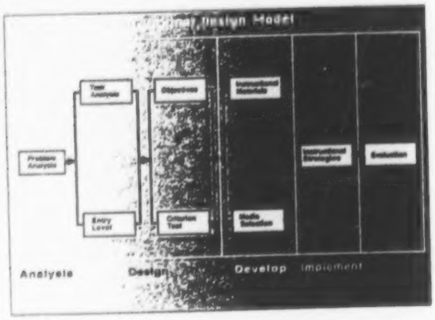
More formal evaluation in also integrated into the project. An *Exercise* folder contains various formative and summative evaluation activities. Formative evaluation includes items which invite the learner to select correct responses from a list. Incorrect responses are flagged. A click on a flagged response provides a rationale for correct response and a prescription for correcting the faulty application of the concept. Queries may be submitted by personal call or submitted to the *Activities* folder are electronically transported to external tutorial agents at the host institution. Dialogues between student and tutor can thus occur by way of the electronic medium or verbally.

Figure 3
Project Three Main Menu



Completed summative evaluation activities are transported electronically to the host institution directly from the *Evaluation* folder. The graded work, replete with prescriptions for corrective action will be transported back to the student. The student is encouraged to take action on the prescriptive feedback and to then resubmit the document for final evaluation. The student is free to accept the preliminary evaluation score or to resubmit the corrected document.

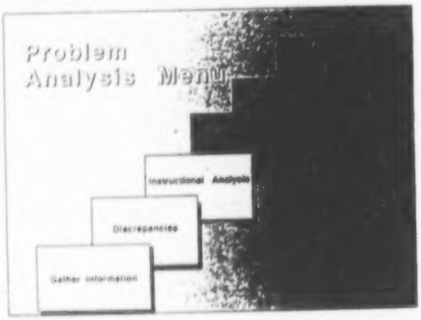
The *Main Menu* layout presents a concise representation of an ID process. Each component of the generalized model quickly reveals the components and flow of activity within the context of a hybrid model. Furthermore, the visual potentially reinforces these general steps each time the learner visits this page. The Problem Analysis screen, as do other sections of the model, also conveys an intentional flow of thought and action that would be reinforced similarly.

Students receive further assistance in locating a referent for their activities within the context of the entire ID process by quick reference to the ID icon in the lower left-hand corner of a screen. The location within the ID process, itself a thumbnail replica, is indicated by a difference in component color and texture by comparison.

Color scheme also conveys continuity and segregation of content. The coloration of the lower right portion of the screen from which the burst emanates changes according to the content of the segment while the overall screen scheme is dominated by a static complement of cooler hues.

The problem of text and visual proximity found in the various textbooks is resolved using selective disclosure. Visuals are placed either in juxtaposition, opaque overlays or as transparent overlays dependent upon the relationship between page components and consequent cognitive load potential. Figure 4 shows a sample of a screen layout.

Figure 4
Project Three Sample Screen Layout



Lessons Learned

Our foundations in ID are broader and deeper as a result of developing this project. We now have experience that includes a better understanding of the importance of interpersonal communication and relationships, group dynamics and power structures, and visual literacy. Since this was an opportunity to undertake an authentic project reinforcing the various concepts and models of ID we added substantially to our understanding of the ID process especially pertaining to user attributes and needs. Additionally, those inclined to do so, added facility with Director as a sophisticated and powerful authoring alternative, as well as with image capture and subsequent editing.

Suggestions for Improvement

First, and foremost, a problem analysis replete with a strong assessment of learner characteristics must be completed. Our group was content to operate from a combined perspective of user attributes and needs. A simple report of the number correct is hardly an adequate assessment and needs much more information to be useful. Thus we would expect refinement in that area.

There are expectations that the screen design and user interface demands would be different on the basis of adequate understanding of intended users. Furthermore, an adequate knowledge base in visual components and design would surely influence the look and feel of our project.

This project would serve as a useful adjunct to regular classroom instruction. With substantial planning and revision it could become an effective alternative to regular classroom instruction. We envisioned its eventual application for a course offered by a distance learning provider that accommodates the differential needs of students for learner support and immediate person-to-person interaction. The project could also certainly have utility as one source of content for an internet-based course.

The potential influence of the project on learning outcomes would draw upon quantitative and qualitative designs. An experimental design would necessarily include a control group of non-users and an experimental group of users. Evaluation of test scores, project scores, and task efficiency and satisfaction may be useful indicators of the project's effectiveness. Analysis of within group differences may also be illuminating.

Project Four -- Shapes and Textures

This project focused on comparing Gagne's Nine Events of Instruction to the nine Instructional Training Events as described in Smith and Ragan (1993). Although each had nine steps, they included different content, and where steps seemed to represent similar content, they were in different order. The question that this project solved was how those two sets of nine items were interrelated, and thus students could engage in an in-depth analysis of how to apply the two processes in a practical way to the ID process.

Topic Selection

This interactive project was developed in order to help students gain a better understanding of the similarities, differences, and interrelationships among Gagne's Nine Events of Instruction and the nine steps of the Training Events. The textbook contained a clear explanation of each, but most students did not take the time to thoroughly analyze the two hierarchies due to perceived complexity. Students involved with this project at first wanted to address simply Gagne's nine events, but the instructor suggested that we address the project in a more extended way and use a visual representation to address the relationship between the two hierarchies. Thus an interactive lesson was developed to visualize the foundational concepts and interrelationships of Gagne's Nine Events and the Nine Training Events.

We believed that the processes could be modeled in an interactive and highly visual presentation with the messages carried by various forms of visual cueing. The visual representation of this lesson takes advantage of dynamic computer graphics, enabling it to be used as an instructor's presentation aid in a classroom setting or by individual students as a supplement to or review of class instruction.

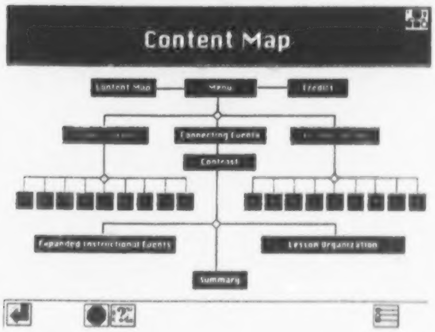
The lesson itself, was not created to substitute or replace college-level courses in ID, but rather, to enhance them. The users can have a broad range of knowledge of ID philosophies, from novice to expert. But, the primary users of this lesson will be the students with a basic understanding of ID.

Design Features

The most important aspect of this project was the emphasis on visual cueing. Several discussions and debates yielded an outline of the lesson's framework of information and presentation format. From that outline, the basic information was translated into a visual format.

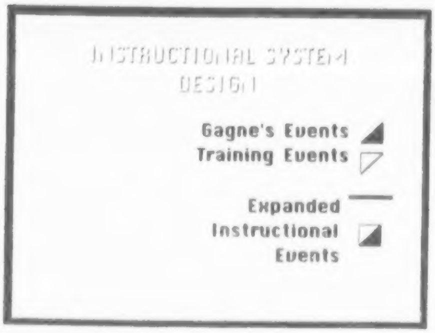
The key to blending the content and visual design was the evolution of the *Content Map* (see Figure 5). The map's purpose was to be a visual navigation tool – allowing the user non-linear access to information. The content map, as it evolved, resulted in an amplification of content information and the interconnection of the elements in Gagne's Events and the Training Events.

Figure 5
Project Four Content Map



In addition to the content map, visual cues were employed as color coding, texture, shapes, and numerical labels. The events as a whole were depicted as a square that was divided into two triangles. Gagne's Events were symbolized by the lower right triangle shape of that square and were in a green color. The Training Events were depicted as the opposite part of that square, the upper left triangle, and were yellow in color. Each triangle also contained the number of the step in question. Thus if standing as separate element, a color-coded triangle with a number was displayed, and if representing an area of matching content, two triangles of green and yellow color were displayed. The numbers in the triangles informed learners about which steps were coinciding. These symbols, minus the numbers, are displayed in Figure 6. The expanded instructional events extended the examples for the learners.

Figure 6
Project Four Color and Shape Symbols



In addition to the color, shape, and numerical cueing, the project employed texture in the content map and throughout so that the learners would have one more visual cue. This cue could be particularly important to people who see colors differently.

Lessons Learned

Team members learned two major concepts during the process of developing this project. First, we learned about the relationship between the visual elements and ID. Second, we learned about going beyond the linear format to employ nonlinear design in a logical way that could aid the learning process.

The relationship between the visual elements and the ID process presented the connection between the use of visuals to communicate ideas and the design process, including the human factors, screen design and information structure that are involved in the interactive instructional system. The ability of the team to look beyond the linear design of instruction for the links to more information grew out of the formative evaluation process. Each team member had and used the opportunity to evaluate, comment, and change the project individually or as part of a group during the formative evaluation process.

The team also found that it was not easy to work together. Different ideas, talents, skills, personalities, working styles, and communications styles all impacted this project.

Suggestions for Improvement

This project should be tested with students in the beginning ID class and adjusted if necessary. It will be important to see if the visual cueing works as we think it will.

The project could be transferred to a compact disc or HTML for presentation on the World Wide Web. This project would lend itself to a research study to compare understanding and retention between classes that use and do not use the software. Part of such a study should evaluate icon styles and other isolated visual elements employed, not just the text-based material.

The crucial constraint was the limitation of equipment and resources needed for the development and presentation of the lesson. We used Astound to develop this presentation because we thought it would be faster than learning to use Director. That limited us in some unexpected ways. One person knew the most about Astound and it created friction among the group in terms of responsibilities. The knowledgeable person preferred to work in Astound, knowing the program limitations, but did not want to do all of the production work, nor spend the time teaching the others to help out. We found that using Astound seemed to be a good choice initially, but it limited what we could do, and it now limits the ability to actually use the product. The program requires a large amount of computer memory to run in Astound and that severely limits the ability to use it in class as result of hardware limitations.

Summary

These four projects represent a sampling of the ideas employed in first attempts to clarify the ID concepts through the use of visual aids. Each is unique and offers original ideas toward that goal. Each has obvious flaws and so there is room for growth on all the projects presented. Perhaps a logical next step will be to get the students who developed these projects to work with others in developing in even better interactive software than what is represented here. As the students work through the process of teaching others, it will offer an opportunity for them to extend some of their original thinking and work in applying visualization to instruction about ID.

References

Smith, P. & Ragan, T. (1993). *Instructional design*. Old Tappan, NJ: Prentice Hall.

Out of the Picture, Out of the Club: Technology, Mass Media, Society, and Gender

Nancy Nelson Knupfer, William J. Rust, and Judy E. Mahoney

Abstract

This paper expresses different points of view about the relationships between males and females, the computer culture, the influence of mass media, and community. It cautions readers to understand the need for sensitivity to the male perspective and the need to address the issue of gender from within a societal context, rather than from a male versus female approach.

While conducting a study about the design of World Wide Web (Web) pages, our research team noted two things that are directly related to gender. First, the majority of individual pages, whether personal or professional, were owned by males. Thus we saw lots of information about males and male's photographs on the Web. Second, we began to notice recognizable signs that gave us clues about whether Web pages were designed by males or females. At first we made some guesses and then we began to categorize things to look for, such as color combinations, images, types of buttons, combinations of angles and curves, and the type of information included within the content of the pages. We are currently investigating that issue and this paper is a background paper about why some of the these differences might be worth examining. Here we investigate some of the literature about gender differences in computer usage that could very well appear in visual form in the next generation of the popular Web.

Images of our society reflect the stereotypes and the realities of gender tracking, often separating males from females. For example, one might think about a common media image of adults at work. The typical chief executive officer (CEO) in real corporate board rooms and in the media is male; he wears a suit and looks like a competent leader. The real elementary school teacher is female, dresses for doing school projects, and wears a pleasant expression; in the media of course, she is young and good looking, or reflects the kindly grandmother image. The roles are defined, the images are engraved in people's minds.

The messages of gender separation begin early, laced throughout society in many ways. For example, the television commercials within popular children's programs feature the gratuitous sequence of two commercials for boys and two commercials for girls, not necessarily in any specific order, but certainly distinctive in gender imaging (Courtney & Whipple, 1983; Downs & Harrison, 1985; Kilbourne, 1990; Lovdal, 1989; Macklin & Kolbe, 1994). The boys' commercials are fast paced, outdoors and rugged, usually involve something on wheels, often depict aggression, employ music with a fast tempo and distinctive beat, and use camera angles that slant up, placing the boys in a dominant position within the picture. The girls" commercials are slower paced, indoors and sweet, usually involve dolls or fashion messages, often depict emotion and caring for others, employ musical sweet calm undertones, and use camera angles that slant down, placing the girls in the less dominant portion of the picture.

The stereotypes reinforced by television carry over into daily life (Berry & Asamen, 1993; Berry & Mitchell-Kerman, 1982; Bretl & Cantor, 1988; Fidell, 1975). Bring this imagery to the real experience of entering a computer consulting office at a typical university campus. The consultants are typically male, speak in a language of their own, and if you can understand the language then you might understand the help that is offered. Of course, the quality of help you get might depend completely on the degree of assistance that the consultant feels like providing, depending on an instant first impression of your needs and your perceived capacity to understand the help you get. With all too much frequency, the consultants miss completely and talk down to female clients or speak a language of acronyms and other technobabble that the females do not understand. Why? Where does this miscommunication start and what perpetuates it?

As we consider the answer to this question, we must ask a host of related questions. For example, why do the commercials depict boys and girls separately, reinforcing the separation by sex at an early age that leads to separation by gender throughout life? At what point and for what reasons do the genders mix in the visual images depicted in advertising and in real life? What messages are given to males and females about turf, not mixing, and why? Is there common ground that can be found, and why is it not more frequently visited? As more emphasis is placed on using the visual media in schools, what implications does this separation have for males and females? The Internet is clearly an environment that was structured by and for males. Now that the Internet is placing more emphasis on the World Wide Web (Web), will this richness of the visual communications environment be male turf like other technology areas or will the Web be utilized as easily by females? What societal factors will influence the outcome? So far, messages within our society that are reinforced by the mass media emphasize that youth and attractiveness are good, sex is important, and males and females have certain roles to play that are separate and distinct.

Gender, Society and Technology

While our society encourages boys to get messy, wrestle, and explore unknown territory, girls get subtle messages to keep their hands clean, play with their dolls, obey the rules, and often they are discouraged from taking science and math in school (Kantrowitz, 1996; Rowe, 1990). While boys and girls are equally interested in computers until about the fifth grade, after that point, boys' usage rises significantly and girls' usage drops (Kantrowitz, 1996). This is most likely due to increased sex-role identification at that age. By high school, students show clear gender bias in their attitudes toward technology (Shashanni, 1994). Surely the attitudes of the high school students will carry into adulthood through higher education and into the workplace.

The neglect and omission of the female population from math and technology fields reveal themselves in subtle ways on an individual basis, but as a collective result appear throughout society as something that begins in the home, and perpetuates itself through schooling and employment practices (Rowe, 1990). If that were not the case, then there would be no need for recent efforts to attract girls into the study of math and science (Kable & Meece, 1994) and the number of distressing stories about females succeeding despite the myriad of obstacles (Aisenberg & Harrington, 1988; Clark & Corcoran, 1986; Frenkel, 1990; Gornick, 1990) would no longer be told.

Although many scholars insist that great strides have been made concerning gender equity, it has not been enough and the subtle biases remain barriers to equal opportunity (Rowe, 1990; Rutherford, 1994; Savan, 1994; Schwartz & Markham, 1985; Signorielli, 1993; Tannen, 1996; Top, 1991). The real concern goes beyond the biases of any specific people, to the larger dimension of the teachers and students, instructional designers, artists, advertisers, administrators, and families that make up society as a whole. The evidence is clear in the games of the children, the classroom practices, the design of educational products and environments, the advertisements found within all forms of visual media, and the visual messages conveyed by the entertainment industry.

Since the computer industry is relatively new, one would expect a more gender-diverse leadership. Yet that is not the case and women continue to struggle to gain knowledge, to gain credibility, and to achieve career advancement within the technology fields (Kantrowitz, 1996). Couple this with the existing difficulties faced by females who work on university campuses (Aisenberg & Harrington, 1988) and the dynamic becomes even more complex, especially as administrators begin to do such things as include degree of technology usage within employee evaluations. It would appear that many females will find themselves stuck, as they say, between a rock and a hard place.

Many people are either unwilling or unable to see beyond their current practices, beliefs, and biases. If that were not the case, then why do we not see more women in top administrative roles where decisions are made concerning budgets, strategies, and policies? The majority of decisions about technological purchases and utilization being decided by males, thus leading to situations that are structured for males users. Why do we not routinely see male administrators seeking the opinions of female subordinates prior to making decisions about technology that will affect them in their work. For example, why are more teachers not involved in fact finding prior to making important decisions that affect their classroom practices? If computer-supported multimedia is such an important part of our lives, then why do we not see more women on the executive boards of technology companies?

The president of a technology company answered this question by saying that women have never been on the board of directors in his company and they are not acceptable candidates because they are not reliable. Why are they not reliable? Well, they will get pregnant and then they leave. When told that the women might come back quickly to jobs that reward them, the executive said the real reason was that women could not be trusted. Why not? Because they do not fit and it would not be appropriate to discuss important business with them (Larsen, 1996). It sounds outrageous but is it really that far from the truth of what commonly occurs in our society? Is it isolated to corporate board rooms? Is it part of the computer culture?

Clearly, there is evidence of different types of usage and different attitudes toward computers between males and females. Men tend to be seduced by the technology itself rather than what they can do with it in a practical sense (Kantrowitz, 1996). Like bragging about fast cars, men often brag about the size and speed of their computers and software. On the other hand, women tend to focus on the utility of the machine rather than its glamour. They do not care about what is on the inside nor what makes it work, but are very much concerned that it function sufficiently well to meet their needs (Kantrowitz, 1996).

The difference can be stated simply as a male tendency to focus on the tool itself and a female tendency to focus on the utility of the tool. While men tend to think of computers as powerful ways to extend their physical limitations, women tend to think of them as a means to an end (Kantrowitz, 1996). Men want to force computers to submit while women just want computers to work (Tannen, 1996). Thus we see a difference in the relationship between people and computers based on gender. The media capitalizes on those differences and further widens the gap by concentrating on or exaggerating stereotypical roles in the way people are portrayed in computer clip art (Binns & Branch, 1995) and in advertisements about computer technology (Knupfer, 1996).

The literature further reveals that women are not well represented in the new generation of high technology occupations. Changing that is important because society can ill afford to waste half of its innate talent, nor can it justify wasting of talent due to gender-based access to opportunities. Discouraging half of our population from entering the high technology fields is a practice that can only hurt our society. Rather than thinking about what is good for which gender separately, the focus should be on thinking about what is good for society as a whole. Instead of arguing for equal rights for women in a way that pits women against men, it would be more beneficial to approach this as a societal problem that must be solved by working together. This distinction is crucial and it can be supported by the way in which women and men are depicted in the mass media.

Girls can achieve equally well in the aforementioned areas but have not been encouraged to do so until recently. And now the attempts are filled with remaining hurtles and barriers that must be overcome (Top, 1991). Meaningful practice must do more to attend to these matters and take an active role in encouraging girls (Van Nostrand, 1991). Designers advertisements, mass media messages, and educational materials can make a better effort to provide experiences that girls can relate to, offering instructional opportunities that are not gender biased, and encouraging teachers to actively attend to issues of gender equity (Turkle & Papert 1990).

Importance of Communities

Although research on computer-mediated communication dates back to the early days of computer network technology in the 1970's, it is only recently that researchers have begun to take into account the gender of the users. Recent research reveals that men and women have recognizably different styles in posting messages to the Internet, and that they have different communication ethics. One analysis of listserve discussions revealed that 68 percent of the messages posted by men used an adversarial style in which the writer distanced himself from, criticized, or ridiculed other participants, and often promoted his own importance. In contrast women displayed features of attenuation; they hedged, apologized, and asked questions rather than making assertions. In addition, the women's postings tended to reveal a personal orientation, revealing thoughts and feelings, interacting with and supporting others (Herring, 1996).

Although some people claim that electronic communications are anonymous and therefore invite participation of both males and females, that will not necessarily be the case if our on-line communicative style reveals our gender. For then gender differences, along with their social consequences, are likely to persist in computer-mediated networks (Herring, 1996). As a part of the on-line network that is fast growing, popular, and graphically oriented, the Web holds a prominent position, so it will have great impact on its users. If females are to use the web productively, then it cannot be restricted to the male domain. Let us examine some ideas about groups, territory, belonging, and oppression, and relate that information to the visual display of information about using computers.

Let us establish a straw man that represents the way that many people believe an identifiable group of people are hurt. In the case we are presenting, the injured or oppressed group is females. Which group is hurting them and why? Since the oppressed or victim group is identified based upon sex, not gender, it follows that the other group, the oppressors, must be composed of males. Logically, it follows that since females do not have equal representation in the high technology fields, remedies are needed that modify the hurtful behavior of the males so that the females' rights to equal opportunity are respected.

This process is based upon two fundamental ideas; the canon of individual rights and the process of "othering." Both of these need a clear airing. They are commonly misunderstood and misapplied. The canon of individual rights simply declares that individuals have rights. These rights are both inalienable and inherent. The United Nations General Assembly passed a statement of these rights in its 1948 document, *Declaration of Human Rights*, and reaffirmed the document within the last few years at Helsinki. In that document, certain things were declared to be *rights by birth*. The concept of *rights by birth* is quite simply wrong. It is wrong because it leaves out the modifying clause, "being born into a society." *Being born into a society*, each individual has certain *rights by birth*. If rights exist only within the context of a society, then that is a crucial omission. First, rights exist only within the context of a society. Second, rights are only violated through willful acts.

"Othering" is an interesting concept that is the dark side of community. Community is the joining together or grouping of individuals in society. If an individual can say that a member of a community is, in some meaningful way, "just like me" then that individual is also a member of that community.

Communities come in two classes, natural and constructed. Natural communities are those that happen by birth or mishap. Skin color is one such community, blindness is another. Constructed communities, which are far more numerous, are largely voluntary. Religions are a good example. Soap opera viewers are another. Some constructed communities are based upon natural ones, for example, a cohesive group based on ethnic origin that has come together to recognize common interests based on that origin.

Communities vary by the intensity of the membership in the community and how society views their importance. Communities play a large and significant role in society. They not only define where individuals fit into society, but also help people to establish identities. They provide continuity and a sense of belonging to something greater than an individual realm. Communities give people purpose.

But community has a dark side which is called *othering*. *Othering* is the opposite of community building. The meaning of being an *other* varies with the community in question. It is the group of people who can be harmful or destructive to a community. For the double jointed community, once you get past elementary school, being an *other* makes very little difference. For a Moslem in Bosnia, a Hutu in Burundi, an urban dweller in Kampucheia, a Jew in Nazi Germany or, at about the same time, a Ukrainian in the Ukraine, being an *other* had very serious consequences.

Othering and Common Ground

For members of our society at present, the consequences of being an *other* are usually not extreme on the surface. However, the

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subtle biases levied by those in powerful positions over many years are cumulative and can be devastating in terms of the domino effect that result. From that perspective, there is a paradigm established from which to examine potential remedial actions to get more females involved in high technology endeavors.

The basic premise of most studies about females using technology is that because the percentage of females using technology is lower than the percentage of males using technology, something is acting to keep females out. Indeed, many women who work with technology believe that the environment is hostile towards them (Turkle & Papert, 1990). A case can be made that women's rights are being violated and remedial action is required to change the technology environment so that women are welcomed. That means there is a need to change the attitudes and behavior of society toward women and technology. Yet gender differences in attitudes toward technology begin in the way that males and females are raised, thus reflecting the social expectations of individuals, family, friends, and society (Canter, 1979; Davies & Kandel, 1981; Eccles, 1987; Houser & Garvey, 1985), so this becomes a rather large issue.

But changing the society is something that must be done carefully. Remember that the canon of individual rights is based upon the premise that having rights will promote and protect society, not damage it, so the technology-using male community should not be damaged in the process. Instead there must be a way to work together to find common ground between the male and female communities. One way of helping to establish this common ground is through imagery portrayed to the general public. Imagery that shows regular women in productive roles using technology in powerful ways would help.

When communities are defined, others become the enemy. Those *others* are individuals. They came to be who they are by their belonging, and not belonging, to a variety of natural and constructed communities. Perhaps their communities are dysfunctional, perhaps they are hostile to people unlike themselves. However they came to be, the fact is that they do exist. The existing male technology community was shaped by our society. Members of that community are different in many ways from typical members of society and those differences became a part of the "just like me" criteria. There are reasons why the communities are as they are. Simply wanting to change, simply demanding females' right to inclusion will not work. Instead, the way to get females integrated into high technology fields is to find a way to get the males and females to be able to say together that they have some common ground within the technology community. That common ground cannot depict females as sexual objects nor decorations nor servants to the male needs.

This concept of building common ground begs society to examine the way it defines community. The deep and persistent problem of gender separation begins in early childhood, permeates the toy and fashion industries, sticks in the minds of teachers who separate boys and girls in to separate groups, and pushes its way into homes as parents succumb to societal pressures separate activities along gender lines. If boys and girls are not allowed to develop working relationships and friendships in early childhood, how can they be expected to overcome the barriers in later years? If they are bombarded with images of stereotypes about gender and technology throughout their lives, how will they be expected to overcome those stereotypes in later years?

It is important to ask men if they are trying to prevent women from joining their community. One of the male authors of this paper remembers his experience at one of the top technical universities in the United States. He recalls that there was absolutely no community with women. While growing up he had a ham radio, model rocketry, model trains, photography, and so on, but no exposure to girls on a social basis. There were virtually no girls involved in any of his activities. Why not? Were his parents narrow minded in this regard? Was his community social structure narrow channeled in this regard? Did he never explore beyond the boundaries of what came in his direction and asked to join in his current activities? In the days of his childhood, it was considered improper for a girl to extend the first invitation to a boy. For what must be a host of reasons, girls were not there and so the experience of working with girls did not exist in childhood years or in college. He says, most male "high techies" do not hate women. They love them, fear them, and perhaps have no clue how to talk to them, but they certainly do not hate them. Women have just never been part of the male world and therefore there is a difference perspective.

You might ask why he did not consider the primary school experience to be a mixture of males and females. After all, boys and girls do participate in joint physical education classes up to a certain grade, dependent upon the community and the school. While it might be true that boys and girls are in the same class, it is also true that some teachers do a very efficient job of separating them within classroom groups. For example, "Preschool X" seems to have wonderful teachers but the entire group focuses on separating the children by gender. The class lists are hung in the hallway and distributed to parents not on the basis of who is in what class, but by gender, with all of the boys' names listed at the top and all of the girls' names listed at the bottom. When children break into groups it is by gender, and even on field trips, parents are assigned groups of children to supervise by gender (Knupfer, 1995-96).

In contrast, the other authors of this paper do remember some slight exposure to the other gender during their childhood years. They also recall that it was self initiated between the individuals involved and not assisted by teachers or parents. Males and females can play together and work together in productive ways. It seems that society offers opportunities to mix, yet at some point during our childhood years those opportunities are changed by parents and teachers who define them as taboo situations, or blindly ignore the opportunities for shared experiences and the consequences of segregation. By the teenage years, males and females are strongly discouraged from intermingling by parents who fear sexual encounters. Are we to believe that males and females cannot interact in platonic ways? If that is a common belief, then perhaps it is a result of the way the media continues to influence people through its portrayal of men and women in stereotypical ways (Roberts & Maccoby, 1985).

As we move into the new forum of Web communication, the public will once again have an opportunity to shape the messages about shared space and gender stereotypes. What will we see in the near future on the Web? At least one author has already portrayed the Web as male space, depicting the changing face of advertising, Web space that is, in a male hat, necktie, and business suit (Geracioti, 1996). Even though the majority of network users are males (Shade, 1993), females must be encouraged to learn skills and be provided with opportunities to have equal access to information, and be portrayed in productive roles using technology. Women will have a chance to stake out a space, but will it be obvious or will it be overshadowed by the male presence that started the Internet and continues to dominate computer culture?

The answer to that question is certainly not simple, but people can influence educational applications of the Web by designing instructional environments that attend to the needs of the female population as well as those of males. Several authors have made suggestions about things that teacher and parents can do to improve gender equity in schools (Couch, 1995; McCormick, 1994; Olivares & Rosenthal, 1992; Ploghoft & Anderson, 1982). Those ideas can be transferred directly to any educational environment that does or does not use technology. To begin, parents and teachers can encourage reflective practice that makes adjustments to the needs at hand and considers ways to disassemble the walls of current gender segregation within our society. The information age brings the challenge of shifting responsibilities and one of the most important will be to find the common ground upon which males and females can find trust and build healthy working relationships that begin in childhood and carry on through adult life. It is no small challenge to overcome the images of mass media and years of stereotypes, but it can be done one step at a time.

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Obstructive Interactive Television Designs: The Influence of Culture, Gender and Power

Nancy Nelson Knupfer and Theresa E. Gram

Abstract

As instructional television becomes more popular it is important to examine the environment in which it is used along with common practices in order to provide guidance in offering the best instruction for all students. This study indicates that even as ITV is reputed to be successful and liberating, it is potentially obstructive and disempowering at the same time. Care must be taken to include the teachers and students who use instructional television in all stages of the planning, implementation, and evaluation processes.

Integration of interactive television (ITV) into the regular course schedule is occurring in more instructional situations and in greater numbers of course offerings each year. If implemented appropriately, ITV can provide a rich and powerful learning environment that employs visual learning in a meaningful way. It can allow the sharing of visual resources across various groups of people, in different geographical locations.

The reasons for the increased use of ITV in recent years are numerous, ranging from the practical needs of serving students to the desire to integrate technology into the learning process. Politicians are pushing for increased funding for and utilization of ITV by convincing people that ITV increases the interaction between teachers and students. Thus the impetus that is moving ITV into more classrooms spans the range from being driven by real curriculum needs to being pushed by technology and it affects a broad range of learners from young children to mature adults in both school and corporate settings.

For each situation, the specific reasons for implementing ITV are varied and many. Yet the common thread among all who implement ITV is that they claim to be seeking a better way to serve various educational needs. Many people believe that the most important advantage of ITV for small, geographically isolated schools is that ITV provides access to advanced or specialized courses that would not otherwise be available to them.

For both rural and urban settings, ITV offers flexibility in scheduling by enabling schools to offer multiple sections of a course, if necessary. This can be especially important in corporate training rooms where various work schedules need to be accommodated in order to participate in the training. Hence, many people regard ITV as a practical tool that helps high schools better prepare students to succeed in higher education and within the career marketplace, and helps improve workplace skills by providing current training into corporate situations.

There is no doubt about ITV's utility in providing enhanced curriculum opportunities and scheduling alternatives, but outcomes of using ITV are varied and complex. There is a dearth of information in the literature pertaining to the complexities of ITV's attendant outcomes. This paper considers important aspects of ITV learning environments that have yet to be adequately explored. It contributes to discourse surrounding equity in opportunities for constituencies who are under-represented in the decision making process surrounding ITV adoption, yet account for a great portion of the faculty and students who must then use it. It touches on material expression of a culture's value system. It illuminates the power structures under whose aegis ITV networks operate. It reviews common design features of ITV classrooms and speculates upon the nature of ITV instructional presentations.

This study indicates that even as ITV is reputed to be successful and liberating, it is potentially obstructive and disempowering at the same time. It can indeed interfere with goal achievement for students and instructors whose needs and preferences are ignored throughout the planning, implementation, and evaluation processes.

Culture, Gender and Power

The socially constructed meaning, expectations, and opportunities based on gender begin with differing expectations for people, depending upon their sex at birth (Stern & Karraker, 1989). The recent news media attention to the pathetic and heart-wrenching plight of unwanted baby girls who have been killed or dumped in orphanages (Chen, 1996; Human Rights Watch, 1996; Tyler, 1996) is not a value that is restricted to the Chinese culture. It is a value the reflects itself in the daily lives and education of many people in many cultures that elevate males to positions of power and control while females are groomed for secondary roles. It reveals itself in the way we groom boys for leadership positions while we teach girls to be submissive, in the way we emphasize the importance of male-dominated sports, in the way teachers respond to boys differently than to girls (Olivares & Rosenthal, 1992), in the way stereotypes are perpetuated in the media (Kilbourne, 1990; Schwartz & Markham, 1985), in the way we recruit for jobs (Bem & Bem, 1973; Fidell, 1975; Rowe, 1990), and in the way we design ITV classrooms for distance education. It reveals itself in the way we provide examples, exercises, and meaningful educational opportunities that males can often relate to better than females.

Meaningful practice must do more to attend to these matters and take an active role in encouraging females (Van Nostrand, 1991). Designers of educational materials and environments can make a better effort to provide experiences that girls can relate to, offering instructional opportunities that are not gender biased, and encouraging teachers to actively attend to issues of gender equity (Turkle & Papert 1990).

Visual designers can accept the importance of their role in shaping the self concept and encouraging equitable access to skills that later translate into life skills and wages commensurate with experience. A more positive and forward-thinking outlook on the role of females in our society can certainly do much to influence the drive and effort that is currently necessary for females to overcome the many obstacles in daily life.

People can influence educational practice by designing instructional environments that attend to the needs of the female population as well as those of males. They can encourage reflective practice that makes adjustments to the needs at hand. The information age brings the challenge of shifting responsibilities and a new opportunity to examine ways to assist females in school situations that employ visual technologies.

A meaningful examination of the merit surrounding any educational practice requires viewing it within the realm of its culture. Institutions, technologies, policies, and practices are material expressions of the dominant culture's ethos and its attendant meanings (Cockburn, 1983; Trask, 1986). Therefore an assessment of the status of ITV requires an unbiased inspection of the institutions involved, technologies employed, policies determined, and common practices within a cultural perspective.

Educational institutions are purposeful enterprises driven by power structures that are informed by openly endorsed agendas of both political and personal origin (Freire, 1970; Knupfer, 1993; Shor & Freire, 1987). The composition of these power structures in relation to ITV is disclosed by an analysis of one Midwest state's instructional leadership structure and a close examination of ITV implementation. This analysis reveals that leadership and decision-making is clearly dominated by males who hold nearly all of the leadership roles, while the people who implement the ITV are females (Kansas State Board of Education, 1995). Preliminary analysis of the various constituencies that guide ITV network operations yields a similar result. Perhaps that is not important, then again, some reflection upon the situation raises questions that suggest that it might be more important than one would immediately realize. For example, consider the possible answers to the following questions.

Are students and faculty best served by decisions that are made by the dominant, male administrative culture? If so, why and if not, why not? In which areas might there be different emphases, depending on the cultural background of the decision makers? What patterns of decision-making are evident in terms of ITV course delivery? To what extent do the current ITV facilities and practices support the needs of those who actually use them? In what ways do the current ITV facilities reflect the needs of the decision makers but fall short of those who implement the technology? To what degree are the physical attributes and value systems of the decision makers reflected in the design of ITV environments and how does this affect the instructors and learners?

From time immemorial, males have been in decision-making roles within American homes, businesses, and educational institutions. Society has carried messages about gender stereotyping within instructional products and schooling practices, through the mass media, within social practice, and so on, thus perpetuating the situation complete with its advantages and disadvantages. Of course, there are good points to male leadership but there also are drawbacks. The disadvantages are likely to occur when decisions are made in isolation without regard to the female perspective.

As we witness a new time in education, when people are calling for school reform and the implementation of technology all in one breath, there is an opportunity to ask once again, whether or not there is adequate representation of the teachers, mostly female, in the business of ITV. It seems that the role of women in relation to the new media has made little progress, possibly even less than that within the more traditional forms of schooling. Could this be because technology has been viewed as male territory?

The deeply ingrained cultural stereotypes and practices related to gender continue to support instruction in its historical sense by constantly feeding the old system while stifling attempts to pay serious attention to gender equity (McCormick, 1994; Gornick & Moran, 1972). Materials developed for use in public, private, and military schools as well as instructional messages delivered to the public through advertising, television, and public service messages continue to portray males and females in stereotypical ways, with males in dominant positions. This has indeed been carried forth into the gender messages portrayed to the public about using the new technologies (Knupfer, 1996). Common practice dictates that males will serve in leadership and authority roles while females serve in subordinate positions. We see it in the images of males and females in the media, and we see it in practice. Thus decisions about instruction are often made by males and need to be implemented by females.

The complexities of this situation are enormous. Like society itself the complexities reflect the dynamics of different situations in different ways, among different individuals. An examination of the complex relationship between instructional planning and design, and gender reveals inequities that result from a persistent pattern of practice. Recognizing the result of those inequities can be easier than finding the causes and correcting the problem.

Inequities that result from the traditional practice of male decision making and female responsibility for implementation within the instructional system often go unrecognized because they emerge not just as a result of what has been done, but also as a result of what has been left undone. The neglect and omission of the female population reveal themselves in subtle ways on an individual basis, but as a collective result appear throughout society as something that begins in the home, and perpetuates itself through schooling and employment practices. If that were not the case, then there would be no need for recent efforts to attract girls into fields of study that are typically populated by males (Kable & Meece, 1994) and the number of distressing stories about females succeeding despite the myriad of obstacles (Aisenberg & Harrington, 1988; Clark & Corcoran, 1986; Frenkel, 1990; Gornick, 1990) would no longer be told.

Innovation and ITV

Implementation is change in action; it is the deliberate spreading of novel, specific change in a planned manner (Miles, 1964). The final outcome of any attempted innovation depends directly upon proper implementation. Fullan (1982) diagrammed four components of the evolutionary process of change and implementation as being along the spectrum of initiation, implementation, continuation, and as the genesis and proposal of an innovation. Implementation embodies the proposal's adoption and use. Continuation involves complete midcourse follow-through by all participants to determine strengths and weaknesses of the implementation. Finally, the outcome of the change process entails the evaluation of success or failure.

After being utilized for many years in various ways (Cuban, 1986), distance education efforts are now placing a new emphasis on ITV that supposedly is more accessible and affordable then in previous years. Unfortunately, the apparently easy access permits teacher and administrators to overlook the need for thorough planning in the rush to place the ITV facilities. Yet without firm direction, ITV could end up in the junkyard with many other poorly-implemented innovations.

The conditions under which an innovation is implemented contribute just as much to the nature of the outcome as do the status of staff preparation and the presence of knowledgeable adopters. Such conditions include the classroom organization, the availability of instructional resources, and the more general demands of the school system or district. The competing demands of modern educational environments impress upon the innovator the need to adapt instructional media to the circumstances and with consideration of the sociopolitical climate (Knupfer, 1993).

The teacher's role in school innovations is so important that educational change depends on what they do and think (Cuban, 1986; Fullan, 1982); Sarason, 1971). Because the teacher lives and works in a classroom with its own built-in imperatives and social culture, the teacher's real working conditions must be taken into account when planning and implementing any educational innovation (Knupfer, 1993). The teacher will judge the acceptability of any innovation by its conformance to current needs and objectives, and not according to some agenda that is foreign to the teacher's experience (Knupfer, 1988). Teachers must help to guide educational change, and not be its victims (Knupfer, 1987).

As a part of the current emphasis on using technology in education, ITV is a fast growing and popular area that holds a prominent position in distance education efforts. In this position, it will have great impact on its users. All too often, political and fiscal forces operate beyond the teacher's control and adversely affect change efforts (Fullan & Stiegelbauer, 1991; Weinshank, Trumbull & Daly, 1983). There is a tendency to oversell innovations to obtain funding and get them adopted by policy-makers, teachers, and others (Knupfer, 1987). Implementation of any change requires that the change have meaning for the teacher (Fullan & Stiegelbauer, 1991). Teachers' concerns about an innovation can be abated or exacerbated, depending on how the innovation is introduced (Knupfer, 1987).

Like any other educational innovation, the teachers must be involved in the planning and implementation of ITV. If teachers are to use ITV productively, then it needs to be implemented in such a way that it meets their needs and they are not uncomfortable. Many scholars insist that great strides have been made concerning gender equity in education, but it has not been enough and clearly, males are still making decisions about ITV without the input of the female teachers. Not only are the majority of decisions about technological purchases being decided by males, but also the decisions about the design of ITV classrooms and utilization of equipment as well, thus leading to situations that are decided by males and structured for males users.

The nature of this differential service is revealed in ITV's emerging language that is generative in nature as it evolves from a of its own set of references. The language of ITV, like that of many other technologies, is sometimes exclusionary in meaning, as well as evocative of prescribed ways of thinking and acting (Segal, 1994; Cockburn, 1983; Lakoff, 1983; Zimmerman, 1983). ITV classroom designs and ITV activities are therefore material expression of the decision makers' value systems. If indeed the value system that is reflected is that of males, by and for males, then how does that affect the faculty and students who are females? If the way that communication is supported and conveyed is predominantly informed by males, then does it address the needs of the female users? The power of this technology and its apparent predisposition to serve a selected part of the population positions ITV squarely into discussions about visual communication and gender equity.

The various physical features designed into the ITV course environment may influence learning among students due to different contributions to cognitive load that emerge from conflicts between perceptions and expectations. A major goal of ITV course delivery is to optimize interaction between instructors and students. Therefore, factors that influence potential interaction and its resulting communication between instructors and students would be evident in the extent of interaction and depth of understanding. On the surface, this statement seems contrary to Boak and Kirby's (1989) observations that females express heightened apprehension about communicating in formal class settings yet score as well, or better, on exams compared to males. The contradiction is somewhat resolved by Warren's (1989) and Patoine's (1989) conclusions that students who encounter alien or inhospitable learning environments tend to exercise one of three options in dealing with them as follows:

1) conform at a personal cost of greater effort expenditure;
2) delay timely interaction while searching for alternative action aimed at attaining the same goal; or
3) practice communication avoidance while grappling with an overwhelming sense of betrayal and helplessness that often portends withdrawal or failure.

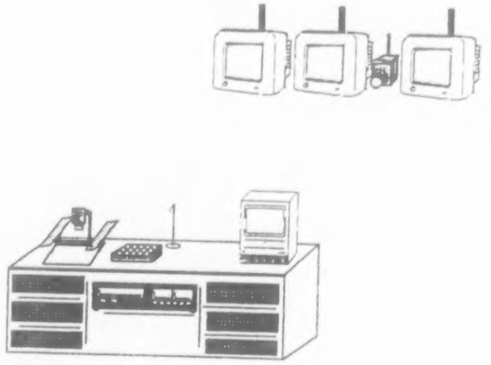
Unfortunately, instructional leaders and policy makers typically possess only superficial knowledge about educational technology (Kirby & Garrison, 1989). As a consequence, technology consultants are often commissioned to clarify the meaning of technoculture's exclusionary language. Because the technology is dominated by males and male language, their powerful role in guiding ITV decisions strengthens and further perpetuates the gendered ethos that is visible in ITV classroom designs and arrangement of ITV instructional technologies that in turn influence ITV presentations. Evidence of that dominion is clearly visible.

Design Features and Implications

Drawing upon the literature, interviews, and observations, profiles of ITV classroom design features were collected from several sites and analyzed. Analysis of this information underscores a well grounded hypothesis that ITV classrooms are designed according to some criteria other than the needs of the instructors and students who use them. Site designs ignore the spectrum of physical attributes and psychological needs of teachers and students. Evidence that gendered messages are made concrete and then replicated in the dimensions of furnishings, locations of audio and video devices, and types of audio handling devices are visible to a certain degree in the different situations.

Data collected in the various design categories of furnishings, dimensions, and layouts indicate a clear and consistent male bias. The console dimensions and the fixed distances between device controls favor a Titan standard from a diminutive person's perspective. The height of the console's work surface and the distance between the work area and control panels compels instructors to exhibit behavior similar to that of students in inhospitable educational settings. That is they conform, seek alternatives, or withdraw. For an example of a typical work area, see Figure 1.

Figure 1
Typical Work Area



Mismatched physical attributes also convey negative messages to students. Unnatural or uncomfortable physical relationships between the console components and the instructor often translate into disruptions in presentation flow that erroneously communicates that an instructor lacks organization or possesses weak presentation skills. Worse yet, unavoidable pauses attributed to design may be perceived as a lack of preparation which may suggest to some viewers that they rank quite low on the presenter's list of priorities.

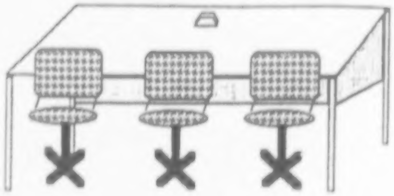
Adding insult to injury, for some instructors the camera and monitor banks are located such that the presenter is obstructed in maintaining the illusion of eye contact with all viewers and so another negative message is sent. This obstructed view can lead to missed student messages to the instructor and the cycle of yet another erroneous interpretation is formed.

Unfortunately, problems with camera locations are not restricted to simulated presence. The potential for camera placement to utterly disable an instructor was revealed by an instructor whose camera tracking device failed causing the camera to be fixed on her ample bust. Armed with nominal technical training and hijacked by her emotions, her novice status congealed rendering her unable to break free from the leering gaze of the camera. She canceled class and no longer enters the ITV classroom with confidence. The camera is now her nemesis and she is not likely to teach another course with ITV. It is likely however, that female students across the sites were similarly embarrassed by that powerful image and her response to it, thus sending yet another message about the inhospitable environment of ITV to females. Viewers are thus not immune to the various design limitations of ITV classrooms.

The gendered perspectives of those who inform the decision-making process impose their preferences on teachers and students in many ways. For example, furniture that is selected solely for its durability, cost, and purported universal fit can quickly translate into an inhospitable learning environment as furnishings are typically not selected to suit the needs of students whose physical attributes are at the extremes of various continua. Students quickly ascertain the likelihood of physical comfort in a learning environment and perhaps too, the attendant success potential. Just as a classroom that is too hot, cold, dark, bright, or noisy contributes to a student's burdens so would personal comfort.

The placement of desktop microphones further exemplifies the authority of a gendered measure in ITV classroom design. Microphone spacing and elevation may signify that microphones are meant to be shared or perhaps are objects for which students shall openly compete. Microphone spacing may signify that one must invade another's space in order to successfully enter into a dialog (See Figure 2). More potentially negative messages take form.

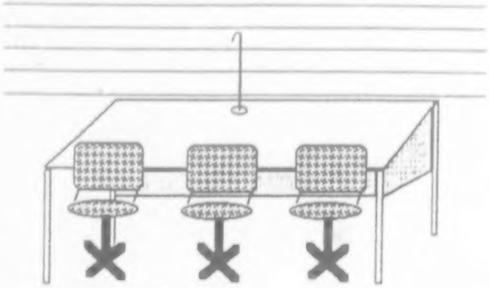
Figure 2
Microphone Spacing



Institutional ignorance of the cultural, behavioral, and sociological aspects of distances between individuals, is evident in many situations. Yet proxemics may be as much an obstruction to communication and intellectual involvement as are displays of dominance by boorish students who stake out turf in front of a microphone and silently dare others to intrude. Ignorance is such a poor defense when information about needs was not solicited from those expected to use the technologies.

Microphone elevation appears to be yet another factor that is typically not considered during the ITV planning process (see Figure 3). Pedestals that place the microphone beyond the cone of effective signal generation yield weak signals. The speaker may thus seem uncertain or timid. Corrective actions toward achieving a stronger signal such as speaking louder or repositioning oneself relative to the microphone may be undesirable or impossible for the teachers or student.

Figure 3
Microphone Elevation



In any case, initial perceptions about the utility and hospitality of any ITV

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classroom may be drawn from interpretations about the meanings of furnishings and room layout. First impressions may potentially set the tone for later interactions and general expectations. Who shall be invited into the interaction and who shall be merely tolerated? Whose expectations should be wholly indulged and whose superficially humored? The key informers of ITV designs are primarily males. Is that dominion manifest in the ITV classroom design?

The male bias is evident, by degree, in the physical attributes of the ITV sites that were examined. Manifest in the classroom objects, it is reasonable to suspect that it should also be evident in the class presentations. Observations affirm that the influence of the dominant culture's perspective is discernible in the graphic art and content display of presentations though diffident in the presentation methods.

The most insensitive display that we observed occurred at a network dedication ceremony during which a psychology instructor opened his presentation with a videotaped image of himself in disguise and intensely examining a Playboy magazine centerfold from various angles. The women in attendance shook their heads in displeasure while a great number of males laughed and grinned. Other men, a small number, did not visibly respond. Follow-up conversations with several of the women, without exception, deemed the presenter to be a consummate boor, ignorant of the boundaries of good taste, and definitely the rube he portrayed. The men who responded favorably were judged as condoning and encouraging of this type of event because of their laughter. The males who did not respond openly and remained quiet were judged as either ignorant that this display was offensive or were thought to be offended as well. While the dedication ceremony itself was an isolated event, the value system that drove its production and allowed it to pass muster can be legitimately identified as an example of the subtle instances of gender bias the occur day after day in a male dominated environments. The male culture drove the media display within the ceremony and the male culture influences the media use under general circumstances.

A parallel study of instructional presentations substantiates a belief that the dominant male culture's value system is permissive both in portraying others in disparaging ways and in omitting portrayal of other cultures. Even when schooled in the rudiments of graphic design for ITV presentations and cultural sensitivity at a workshop, most instructors produced sample presentations that were marginally attentive to the total visual message and to the representation of gender-based messages.

It would be a mistake to make an unfounded leap toward assigning apparent gender bias in presentations to cultural dominance since other factors contribute substantially to presentation content and delivery. Among those factors are the:

1) amount of time available for production of presentation images,
2) lack of available scanning technology,
3) nominal skills in production design and development,
4) ignorance of issues in visual literacy,
5) ignorance of issues of instructional design,
6) limited clip-art libraries bundled with presentation software.

These circumstances combined with cultural values promote the use of canned graphics on prepared templates in ways that yield a visual concoction that transmits conflicting and negative messages. For example, the large majority of clip-art images available with the popular software depict males in leadership and authority roles, while women are depicted in subordinate roles (Binns & Branch, 1995).

Recommendation

Though standardization across member sites of any particular network is a desirable feature, great care must be taken by decision makers to insure that the many needs of the actual users are identified and equitably addressed. This means inviting and embracing the participation of various representative constituencies into the fact finding and decision-making processes.

Even though all needs cannot immediately be met, it is important to view ITV classroom designs with amenability to adaptation as a guidepost. It also would be helpful to deliberately fund specific line items aimed at a spectrum of planning check points ranging from current to long plans toward meeting users' needs. In doing so, perhaps the burdens students bear will be lightened in some measurable way.

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Gender Equity On-line: Messages Portrayed With and About the New Technologies

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Abstract

This paper examines gender messages within advertisements and informational, technology-focused materials that are targeted toward a general population of consumers. A close look reveals a clear, consistent, and pervasive pattern that clearly favors males. The authors raise issues about message design, language, images, advertising, educational facilities, packaging, and socially constructed gender roles that carry over into applications of the new technologies.

Over the years, society has carried messages about gender stereotyping through traditional forms, within instruction and schooling, mass media, social practice, entertainment, and so on. The increased attention to gender equity should yield more balance, especially as related to the newer media that are being emphasized within educational settings and fields of employment that involve high technology applications. As more emphasis has been placed on using multimedia for instruction and job training, one would expect to see both women and men using the computer-based media in meaningful, productive ways. Yet a close examination of gender as portrayed within the popular media, reveals a clear, consistent, and pervasive message that has deep historical roots, winds throughout our daily lives, and perpetuates itself through the complexities of society. The role of females in relation to the new media, has made little progress beyond that depicted within the older media forms.

As computers replace typewriters, telecommunications and multimedia become more prominent in educational settings, and personal computing assumes greater importance in more homes, females have gained more access to the technology. Yet females still are portrayed in supportive roles while males are shown using the technology in productive ways that benefit their careers.

These persistent patterns continue to influence public perception of gender stereotypes and perpetuate attitudes that clearly favor male technology users. Instructional practice is influenced by these messages which constantly feed the old system and all but strangle attempts to pay serious attention to gender equity (McCormick, 1994; Gornick & Moran, 1972). Materials developed for use in public, private, and military schools as well as images delivered to the public through advertising, television, and public service messages continue to portray women and men in stereotypical ways.

The consequences of this portrayal are evident in our schools. Research reveals that among high school students there are consistent, significant gender differences related to interest and confidence about using computers as well as gender-stereotyped views about computer users (Martin, Heller, & Mahmoud, 1992; Shashanni, 1994). The low confidence among girls in working with computers, and interest in computers, can be explained as a product of the social institution in which their individual self-concepts are built (Shashanni, 1994).

Despite attempts to correct this situation over many years, progress is slow to come and it is obvious that gender bias continues concerning use of the new media. For example, a study of computer clip-art images available for business, school, and home use, revealed that the stereotypes have invaded the desktop computing environment, with images of men depicted in leadership and authority roles, while women are depicted in subordinate roles (Binns & Branch, 1995).

The complexities of gender stereotyping are enormous, yet can be difficult to recognize, reveal, analyze, explain, and redirect. Like society itself the complexities reflect the dynamics of different situations in different ways, among different individuals. An examination of gender stereotyping in advertising regarding technology, reveals inequities that result from a persistent pattern of practice.

This paper addresses the visual messages about gender that are portrayed in the advertising about computer technology.

Advertising is the mass communication of information usually paid for and usually persuasive in nature, about products, services, or ideas presented by sponsors via various media (Arens & Bovee, 1994). The pattern of gender bias in visual messages and stereotyping which prevails in advertising seems to be carrying the same old messages from print to television and beyond into the newest format for advertising, that of the World Wide Web (Web).

Ads Perpetuate Stereotypes

In the Spring of 1996, the chair of a technology planning committee at a major university compiled a folder full of technology advertisements for the perusal of a committee charged with making decisions about the technology needs of an entire college. Only one of the advertisements contained images of females. That particular advertisement contained four images within one page; one of a male, two of females, and one of a product produced by the computer imaging technology.

A closer look revealed that the presence of females did little to promote the role of women using technology successfully. In one image, the woman was portrayed as small and insignificant, off to the side of the picture, and wearing a red, casual blouse. The second female image was that of a teenage girl, positioned as a tiny image at the bottom of the photo, sitting in front of a computer but not using it; she was reading a book and wearing a red blouse.

In contrast the image of the man was big, bold, up front in the photo; the man looked knowledgeable and in charge, was wearing a white lab coat, and was clearly a chemist or chemistry professor who was using the technology to his advantage. Upon questioning by a member of the technology planning committee, it became clear that the male committee chair, a career school administrator, had not noticed any gender differentiation and did not think that it was important enough to merit a second thought. The folder was circulated among the committee members for their perusal in selecting multimedia equipment for a yet undesigned multimedia classroom. Not only was the imagery of technology for males perpetuated, but the idea of selecting equipment with complete disregard for the educational environment was being mandated.

This experience led to an examination of a representative sample of popular magazines and promotional material about multimedia technology that were available to the general public and teachers, from direct mailings to schools, at newsstands, libraries, schools, and areas of public transport. Areas of public transport included such places as airports, train stations, subway stations, travel agencies, business class and tourist hotels, as well as aboard airplanes, trains, passenger ships, subways, and trains throughout the United States, Asia, and Europe. In addition, television and internet advertisements were examined over the course of the next several months. Not surprisingly, there were commonalities in the portrayal of gender that carried across the print, televised, and internet advertisements.

The prevalent portrayal of gender roles in advertising says a lot about the society it represents. Not only is an advertiser selling a product, but an identity or image, which can be attained only by purchasing the product. But the aftermath is that the consumer is left with a deceptive, manipulated, and rendered personality that does not represent the behaviors of the consuming public.

Research indicates that in both the print and video advertising marketplace, consumers see at least three times as many male as female characters associated with the products being sold. This is especially true of advertising aimed at children and teenagers. In those advertisements that used spokespersons or endorsers, the ratio was nine males to everyone one female (Adler, Lesser, Meringoff, Robertson, Rossiter, Ward, 1980). When featured in advertising, women tend to be represented in select feminine roles such as wife, mother, nurse, teacher, or secretary (Macklin & Kolbe, 1984).

Stereotyping is a basic part of human cognitive activity and people do make categories and construct relationships based upon similarities and differences that enable them to make predictions in daily life. Social categories play a vital role in any person's thinking about people so it is important to attend to where these categories are used and to what purpose they are put (Young, 1990). Unfortunately, many people do base their opinions about social issues and the role of females on the messages delivered through the mass media, including the advertising media. Images of women do remain as a socially constructed category in peoples' minds.

Print-Based Advertisements

A representative sampling of magazines collected by several people revealed consistent patterns in the advertising about the new technologies. Men were portrayed in prominent positions within the advertisements and accompanied by messages to "work stronger, work harder, gain power, manage people, and gain career advancement." The men projected professional images of people with great competence who were successful at work. The women on the other hand, were depicted in subordinate positions, serving others, and in roles that did not use the technology to accomplish their jobs or gain power or promotions. The women were usually wearing casual dress, often red in color, and seemed to be used as decorative graphics rather than in any meaningful way.

One magazine for educators, contained only two technology advertisements that included people. Toward the center was an ad with two women teachers, one a middle-aged, grandmotherly-looking, English teacher and the other a young, slender, blond, graphic designer. There were the stereotypes, the overweight and dull-looking grandmotherly English professor and the sexy, young blond graphic designer. Unfortunately, the advertisement also depicted both women standing at the bottom of a stairwell, clearly doing nothing for their career success by using their laptop computers that matched their body builds. Yes, the grandmother held the heavier, boxy laptop, and the young women held the more slender laptop, while the advertiser claimed that the computers were matched to the needs of the two women.

The inside back cover of that magazine carried the second image of a person, this time a male. In addition to being in a more prominent cover spot, the man depicted in the advertisement clearly was on top of the world as a result of using his laptop computer. He was freed of his ties to his office and was overlooking a beautiful body of water with lovely islands, working independently. Obviously, his laptop computer had liberated him from the physical confinements of his office space.

Both advertisements were produced by the same company, both were in black and white, both promoted laptop computers, and both followed the stereotypical representation of men and women regarding computer usage. Further, the advertisers even included the typical media portrayal of women as either grandmotherly or young and sexy. What ever happened to typical-looking women? Why are they absent from the advertisements?

Not one of the printed advertisements showed women achieving school or career gains due to using the technology. Why not?

In contrast to the teenage girl wearing the red blouse and reading a book while sitting next to a computer, a similar advertisement depicted a teenage boy who was proclaimed to have discovered a prize-winning formula, obviously implying that he did so as the result of his use of computer technology. This contrast seems obvious. Why then would so many people not notice the imagery and continue to perpetuate it?

There were some interesting advertisements for business travelers that focused on the great features within new models of wheeled luggage that could be rolled down airplane aisles. Those with male characters tended to emphasize pockets for computer equipment, maintaining a common statement of being functional within a technological business sense. The advertisements with female characters focused on being lightweight and spacious enough for all of a woman's weekend fashion needs.

One luggage advertisement clearly depicted three servants who were packing their employer's bags in preparation for a business trip. Although the reader could not see the employer, it was obvious that he was male from the collection of objects the servants had gathered. The most prominent feature of the advertisement was the computer equipment that fit so neatly within the luggage compartments. The advertiser wanted so much for the computer space to be noticed that the computer was given a much more important spot than the luggage itself. Perhaps most importantly, the advertisement clearly portrayed the message of the computer being a male machine, a very important male object within the collection of male clothes and supplies.

An eye-catching advertisement for a computer server, depicted a young, slender, and very sexily-posed woman sitting on the floor and leaning on a red, distorted computer standing in the vertical position. The woman was purely decoration. The advertisement dripped with sexual innuendo. A subliminal image of male genitalia was super-imposed onto the upright computer, reflected in the white lighting that matched the woman's white blouse that leaned against it. Such an advertisement certainly raises questions about what is being sold and under what disguise?

From this sampling of printed advertisements, it is clear that females are depicted in technology advertisements much less frequently than males. Further, when women are depicted, they are usually used as interesting decorations rather than as productive users of the technology.

Televised and Video Advertisements

The complexities of television advertising are too great to address fully in this paper. Suffice it to say that the television industry depends upon money from paid advertising for its livelihood. Further, the television networks are responsible to the advertisers, not the general public of television viewers, for the viewers do not support them financially (Ploghoft & Anderson, 1982). Thus the advertisers have a great deal of power concerning the kind of messages that are issued to the public via television.

Television is a pervasive presence in our nation's homes, and is argued to be the most common, constant, and vivid learning environment (Signorielli, 1993). Television's vivid and recurring patterns of images, information, and values leave few people untouched. Numerous studies conducted over more than twenty-five years, show that the mass media plays an important role in the socialization process of children and adults (Berry & Mitchell-Kerman, 1982; Roberts & Maccoby, 1985; Signorielli, 1993).

Advertisements on television are sex typed and stereotyped (Courtney & Whipple, 1983), with strong links made between women and attractiveness (Downs & Harrison, 1985), and men and authority (Bretl & Cantor, 1988; Lovdal, 1989). Research generally shows a relationship between television viewing and more stereotypic conceptions of gender roles, with television promoting notions of more limited roles for women in society (Signorielli, 1993). Women in advertisements have been portrayed in bathrooms, kitchens, living rooms, backyards, and other home making roles, yet it is almost invariably men who advise women on the virtues of new household clearning products, thus disempowering women even in the home and limiting them to roles of physical attractiveness and submissive domesticity (Rutherford, 1994).

Some advertisements directly state that they are empowering women, but in actuality they are only manipulating them (Savan, 1994). A large portion of advertisements tie women to the house through a sense of guilt by twisting the complex relationship between guilt, household cleanliness, and womanhood. "Since a woman could wield authority only in the private domain, if she failed to stamp out dirt, she failed as a woman" (Savan, 1994, p. 189). The advertisers continue to bombard women with images of cleanliness and multiple specialized cleaning products, that if purchased would actually keep women cleaning for longer periods of time, rather than relieving women of work as a result of buying the products. The advertising industry combines its approach to sell women with the guilt and fear of not pleasing others enough, with not being perfect enough, while at the same time running parallel advertisements that play on self-empowerment realized by purchasing something solely for personal reasons, like clothing, shoes, or cars (Savan, 1994).

If we were exposed to few advertisements, this might not be as serious. But how many commercial advertisements are we likely to see on television? A sampling of popular programs during September 1996 shows that we are bombarded with advertisements (see Figure 1).

Within the advertisements are a smattering of technology-related topics. For example, there were two different United Parcel Service (UPS) spots that advertised the new on-line package tracking system. Both advertisements opened with shots of a female worker in an office, but it quickly became apparent in each that she was doing some clerical task that was

Figure 1
Television Advertisements by Program

Title	Day	Time	Minutes	Number Ads
Bill Nye Science Guy	Weekdays	4:30 p.m.	30	0 - Public TV
Sseinfeld	Weekdays	6:30 p. m.	30	10
Ellen	Wednesday	7:00 & 7:30 p.m.	30	14
60 Minutes	Sunday	6:00 p.m.	60	18
Sesame Street	Weekdays	8:00 & 9:00 a.m.	60	0 - Public TV
Days of Our Lives	Weekdays	12:00 & 1:00 p.m.	60	45
Murphy Brown	Monday	8:00 p.m.	60	19

unrelated to the package tracking. One male in each commercial took center stage and manipulated the computer to track the package. Clearly this depicted males controlling technology while the females tended to more routine clerical duties. Both advertisements contained mostly males within the working crowd. That might very well reflect the nature of the population at work.

American Telephone & Telegraph (AT&T) sponsored an advertisement showing four boys walking down a country road and doing fun things. There was no direct message about what their actions had to do with AT&T, but in any case, males were identified with AT&T.

One advertisement for cellular telephones shows a female real estate agent receiving a call right in the middle of showing a beautiful home to potential buyers. Does she act upset at the interruption? No, she is relieved that the school nurse was able to call her to pick up her sick daughter. Her cellular phone had served its purpose to her role as a mother, not as a real estate agent. A parallel advertisement for the cellular telephones featured a male who was able to perform his job much more proficiently because he could receive business telephone call while out of the office with another client.

A promotional tape for the Video Toaster yielded more of the same. The video was obviously targeted toward a male audience. The music was reminiscent of a football game pep rally, and it kept up its fast pace throughout the video. The male voice was authoritative, knowledgeable, and even macho sounding. The images of females in the tape were purely decorative. First, there was a woman operating a camera for the benefit of her male colleague. Then there were several women used as beautiful models while the males learned about the capabilities of the video toaster and image digitizing. The eight-minute video even contained shadow views of women in profile dancing across the screen either in the nude or in tight-fitting clothes. This was done in order to demonstrate those video effects. There was only one woman's name in the credits; she is a company employee and played the part of a model in the video. Training tapes from the same company reflect the same style, so you can imagine what it might be like for a woman trainee to use them. It appears that the company did not expect women to be serious users of this technology, but simply to be models that the men would video and then digitize.

Internet-Based Advertisements

Most of the visual representations of women in Web advertising are a reflection of the current trend used in the other advertising media. Women are portrayed as decorations or simply as product users. When depicted in the same or corresponding type of advertisements as men, the women are shown in supportive or subordinate roles. The male central characters in advertising are depicted as men in authority roles and as gaining more power by using the technology. The focus frequently is on their faces and they are shown in business dress or high class casual wear that suggests a successful business man. The female central characters, on the other hand, are usually depicted by a lovely body or faceless, selected body parts. When faces are shown, they reflect a beautiful and friendly person, but do not suggest achievement.

For example, in the Yahoo search engine a series of three advertisements were found in the business and economy section, under health and fitness. The first advertisement portrays the upper left part of a male torso, with no head, and obviously emphasizing his musculature but not necessarily sex.

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The next advertisement depicts a female full body image in a graceful backbend that begins with balancing on the toes and ends with the arms and fingers pointing in a nearly parallel position to the feet and legs. The reader is compelled to give the advertisement a second look because of the extreme body position. A third advertisement at that spot is intended to sell exercise equipment and it depicts a blond female in a black dress sitting with one armed raised to lift her hair from her shoulders and looking very sexy. There are no images of the exercise equipment being sold, only the suggested result. Of course, the reader could choose to click on a button to find more information about the site and would then eventually encounter some information about exercise equipment.

Another set of advertisements for AT&T WorldNet Service is drawn from the Yahoo search engine under the topic of K-12 and college preparatory schools. Four advertisements in this series, two with male characters and two with female characters are described here. The first advertisement depicts a young adult male on the left of the bannerhead who says, "hi, my name is TIM and I can't get on the INTERNET." Across the banner on the right side of the screen, a mature adult couple reply "hello TIM" and give the visual impression that they will help him. The second advertisement depicts a young adult male on the left side of the banner who says, "my INTERNET access bill ranges anywhere from $10 to $200." The mature man, appearing to be a mentor or fatherly image, on the right side of the banner replies, "You need STABILITY, Pat." The third advertisement depicts a young adult female who says "my provider LEFT town on me." Across the banner from her, on the right side of the screen, is another adult female who says, "I know how you FEEL." The women seem to be helpless, discussing feelings of abandonment but not of finding a solution. The fourth advertisement depicts a young adult female on the left side of the banner who says, "My provider never called me BACK." The woman who replies to her from the right side of the banner says, "Did you speak CLEARLY, Jan?" What kind of message does this give to males and females who might use this service? It certainly does nothing to promote women's confidence and control within the high technology environment.

In addition to the content of the advertisements, the placement of the advertisements can seem curious as well. For example, in the Excite search engine, we found an advertisement for Kaufmann investment funds under the reviews section within the subtopics of shopping and swimwear. The page gave information about tan through swim suits and how to see on-line photos of women modeling bikinis that then could be ordered by calling a toll-based telephone number. At the top of the page was the Kaufmann investment advertisement depicting two businessmen, looking very confident and self-assured. The focus of the advertisement was on the men's faces and confidence suggested by wise financial investments. Why was this advertisement in the ladies swimwear section?

Another curious placement was an advertisement for the OutPost Network which depicted a woman's friendly-looking face asking "How come you never write?" This advertisement clearly did not portray the woman as confident, but again as having been abandoned, this time by a man. The Yahoo search engine had placed this advertisement within two areas that we stumbled upon within Society and Culture. The first was within Gender, Men, Circumcision and the second was within Gender, Men, Fathering. It is curious why these advertisements were placed in those locations. Certainly there is room for social suggestion about women's status, the relationship between men and women, social responsibility, who is in control, and so on.

Imagine the impact these types of advertisements and their subtle messages might have on a woman's self-esteem. Are these the type of images we really want to provide to our young girls? How do images like these add to the message of the internet being the male domain? Can images like these influence decisions that females make about their interest in the fields of science and technology? A number of key questions need to be asked regarding the use of advertising about technology. Are current advertisements targeted toward the male users of the Web? If so, why? Is the visual representation of gender roles in the Web advertising reflective of the current skill and level of computer usage by a majority of women? Shall we then assume that women have difficulty using the technology in productive ways? Why?

The Web offers a number of opportunities for advertisers to complement other forms of media, not replace them (Teague, 1995). The number of print advertisements that include a web address is growing each day. Advertising on the Web can be inexpensive compared to print or televised advertisements. For example, Amoco, a $27 billion petroleum and chemical products company launched a home page on the Web during the past year and during the month of August, 1996 enjoyed 285,527 "hits" on the site (Geracioti, 1996). A Web site with an extended presence can have an estimated annual cost that is equivalent to a single full page ad in one or two issues of a major trade magazine. Further, the Web has the benefit of using real-time interaction to collect marketing statistics.

In many cases, Web advertising is comprised simply of company brochures delivered electronically, but in other cases the sites are more sophisticated. It is clear that the advertisements now have another venue of delivery and that the same types of gender stereotypes have emerged in that capacity. The question we need to be asking is, how can the growing technological marketplace of the Web be used to bring about change in the way women are presented visually to the public? How can the imagery of women and technology be influenced by regular people like us?

Community Adjustments

Visual imagery of men and women working together and using technology productively would provide some common ground of experience, and it could do wonders for improving some of the attitudes about gender stereotypes concerning technology.

If an image is indeed worth a thousand words, if it leads to a cognitive understanding and expectations, or it shapes self concept, then images of women and technology must evolve to a more fair representation, not just in numbers of women depicted in technology advertisements, but in the quality of the way they are depicted within those advertisements.

It can no longer be acceptable to portray women in print, televised, or internet advertisements about technology as subservient, in the background, or not using the technology in a productive way. It is not acceptable to portray boys developing the wining formula while girls sit beside computers and read books. It is not acceptable for men to be portrayed as successful, powerful, and in control due to technology while women are portrayed as simply nurturing and friendly, or worse yet as sexy decorations draped over computers. It is not acceptable to show women using cellular telephones solely in the role of mothers who get called away from their jobs due to mothering responsibilities. Although that is part of life, it is not the part that is stressed with the fathers who use cellular telephones at work.

Finally, it is not acceptable to depict women as fluff on government Internet pages, supported by taxpayer dollars. As the Internet becomes more accessible and popular with increased numbers of users, it will become more important as a vehicle for advertisers. This is a computer-based medium, yet if current trends continue, it too, will depict technology as part of the male domain.

The responsibility to change the public image and attitudes about females and technology cannot rest solely with the advertisers, but they can do a lot to help change the public image. Most certainly it will take pressure from the research, women's, business, and public communities. Teachers, parents, administrators, politicians, authors, illustrators, instructional designers, medical personnel, and all other community leaders who work with children will need to be aware of the issues as well, so that they can help bring about the changes necessary to unlock the doors to the technology field for the female community.

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A Thinking Person's Comedy: A Study Of Intertextuality In "Cheers"

Anthony Hlynka and Nancy Nelson Knupfer

Abstract

This paper explains the nature of intertextuality concerning television programming, then analyzes the modern television comedy *Cheers*, comparing and contrasting it to classic works. The lead author of this paper is a 17-year-old high school student. The paper is a commentary on the level of critical expertise a properly motivated and visually literate high school student can display.

As society places more emphasis on the visual media and less emphasis on reading, educators must examine the messages carried through the visual media. Further, they must learn to read visual media and in turn, teach their students to practice critical viewing skills. Television is a visual medium that carries powerful messages to people and helps to shape their actions, beliefs, and empirical knowledge (DeVaney, 1994). Commercial television employs story, along with visual effects, to impart cultural influence upon the viewers.

Commercial television is one of today's major transmitters of culture. Many aspects of social roles are reflected and even exaggerated in television programming. For example, patterns of speech, dress, fashion, family rituals, group behaviors, and other social roles are simultaneously present in television programs (DeVaney, 1994). Further, the visual message employs the power of motion combined with color and sound to call upon the affective domain, thus employing powerful, emotional impact that can greatly influence the viewers. Advertisers and political campaign managers know this and thus, they utilize the television medium to its fullest capacity to deliver specific messages to targeted groups of people.

As more television, videos, and multimedia carry visually dependent messages into schools and homes, consumers will need to educate themselves, their children, and their students about how to read visuals and their accompanying auditory text. The text of television includes the story within the visual and verbal channels, which work together to impart the message. Thus, the grammar of television is one that must be studied, analyzed, and interpreted.

Historical works of literature can be portrayed in many ways while maintaining the intended message. Shakespeare's great plays are an example. Intended as visual works, many people read these plays in books and study the literature accordingly. Now the video versions are available for check-out at most public libraries and are indeed often recommended as a starting place to understanding a play, prior to reading the text.

Television programs are not that much different. They begin as plays written for screen presentation, but the viewing audience usually has no chance nor desire to read and analyze the printed version of the program. Thus, visually literate television viewers must learn to interpret the visual and verbal text of what they see on the screen at the time that it is displayed.

In the 1600s, there was evidence of people first believing what they read in print through their reactions to Shakespeare's works. Today there is ample evidence of people believing what they see in the visual media of film, television, computer, and other communications media. For example, see the collection of literature devoted to analysis of campaign advertisements on television.

To adequately prepare people to understand visual messages and then to critique their value and believability, it is necessary to prepare them to be visually literate. This literacy calls upon various theories that are beyond the scope of this paper, but at its heart depends upon viewers to be able to receive, understand, and critically examine the messages to the point where they can interpret the visual media on their own.

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This paper addresses the television program *Cheers* and demonstrates one way of interpreting the complexity of messages within the program. While *Cheers* indeed properly belongs within the domain of pop culture, the examination of such programs is critical if one is to fully grasp the impact of television media on society. Serious analysis of television programs is under utilized in most *visual literacy* curricula. Yet, it provides a rich variety of material from which to choose.

Intertextuality Defined

This paper shows how students can examine television content as the literature of our time. Such visual literature employs interplay among text, imagery, culture, and meaning. This interplay of messages within the *Cheers* programming will be referred to as *intertextuality*. Intertextuality is the relation of one text to another in order to get across an idea. In theory, intertextuality proposes that any one text is necessarily read in relationship to others and further, that a range of textual knowledge is brought to bear upon it. Intertextuality exists in the spaces between texts and their meanings (Fiske, 1987).

The term *intertextuality* is used in this paper according to the usage of Scholes and Fiske. Scholes writes that "the common principle is that just as signs refer to other signs, rather than directly to things, texts refer to other texts" (Scholes, 1982, p. 145). Fiske, likewise, prefers to use the word *intertextuality* to describe the nature of television text. He writes, "Reading and talking about television are part of the process of making a text out of it and are determinants of what text is actually made...The textuality of television is essentially intertextual" (Fiske, 1987, p. 15). Fiske further writes that a textual study of television includes "the intertextual relations of television within itself, with other media, and with conversation" (p. 16). Thus the term *intertextuality* is central to the discourse of this paper.

John Fiske (1987) identifies two basic types of intertextuality which can serve as a framework for our analysis of *Cheers*. These are horizontal and vertical textuality. Horizontal textuality refers to relations between primary texts "along the axis of genre and content" (Fiske, 1987). In *Cheers*, genre intertextuality means examining how *Cheers* works as a situation comedy, and in particular how it is different from other situation comedies.

Content intertextuality refers to the use of specific allusions to other texts. *Cheers* is full of such allusions and that relation is the major focus of this paper. The intertextuality within great literature, such as works by Ibsen, Checkov, Dickens, and Shakespeare, deconstructs the traditional opposition of bar versus culture. The series constantly brings culture into the bar setting, which of course, is in real life incongruous. The *Cheers* bar is a cultured bar. However, this statement itself can be historically deconstructed. The original medieval tavern and coffee house was indeed a center for lively intellectual debate.

The second type of intertextuality is vertical . Fiske defines this as the relation between a primary text and those texts which refer to and discuss the primary texts. "Vertical intertextuality consists of a primary text's relations with other texts which refer specifically to it. These secondary texts, such as criticism or publicity, work to promote the circulation of selected meanings of the primary text." (Fiske, 1987, p. 117). These include secondary texts, such as critical studies. In the case of *Cheers* this includes analyses in the popular press such as *Life*, *TV Guide*, *Sports Illustrated*, and other sources. These secondary texts, such as criticism or publicity, work to promote the circulation of selected meanings of the primary text. All these attempt to *explain* the function of the series from a particular point of view.

The idea of a visual medium being described as text is not new. Reading visual information is a skill that must be developed. Interpreting, analyzing, and critiquing visual information depends upon proper reading of the visual information.

Television is composed of scripts, put into verbal and visual form along with other trappings. The field of visual literacy includes the study of visual and verbal information. Consistent with this approach, Ann DeVaney discusses the "grammar" of television (DeVaney, 1991). In turn, Michael Apple describes the Channel One television news program as one of the new "texts" of education (Apple, 1993). Thus the idea of television

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programming as a verbo-visual medium fits well with its analysis considering the concept of intertextuality.

Television Viewers and Cheers

Television viewers "are not cultural dupes lapping up any pap that is produced for them" (Fiske, 1986, p. 214) and *Cheers* is not merely a mindless comedy. Rather, the writers took much care and effort in molding it to fit their idea of an intellectual comedy, aimed at an intelligent audience. Jokes are not pulled out of a gag file, but are carefully crafted intertextual statements with visual and literary allusions. These allusions carry social and cultural overtones, presenting an intellectual challenge to the viewer who actively attends to the interplay.

More than a simple comedy striving to keep viewers entertained, *Cheers* is full of intertextual references, which engage the intellect and make it all the more humorous. This makes *Cheers* a thinking-person's comedy. It becomes clear that when watching *Cheers*, one needs to consider more than just the surface appearance.

The Cheers Program

Cheers was the creation of Glen Charles, Les Charles, and James Burrows. Their goal was to create an American *Fawlty Towers*, John Cleese's classic 1980s slapstick comedy set in a British inn. The show itself was full of comic characters. *Cheers* was the source of some of the greatest comic talent since Jackie Gleason of the sixties. Director James Burrows calls the show "lightning in a bottle" (Darrach, 1993, p. 64).

In early versions of the show, *Cheers* was to be set in a country club, or a hotel in Las Vegas, but the writers finally settled on a bar, primarily because "no one had to have an excuse to come into a bar" (Darrach, 1993, p. 58). On September 30th, 1982, a semi-intellectual college student walked into a bar. This marked the beginning of *Cheers*, soon to become one of the most popular television shows in history. This Boston watering hole would be frequented vicariously every Thursday night by millions of viewers across North America, Europe and Australia.

The setting of the show was a simple one: A bar in the middle of the Boston common, owned by ex-Red Sox pitcher, Sam Malone. Together with Sam was a variety of bar regulars, the small pub was their home. *Cheers* was a window into the lives, troubles, and adventures of these people. There was no need to have intricate plots and complex story lines; "Just open the door, and the stories will walk in" (Darrach, 1993, p. 64).

In the first season, however, despite rave reviews and testaments of its impending success, *Cheers* ranked in the last place out of seventy-seven programs. But when *Cheers* won five Emmies in its first year, the directors decided to give it a second chance. "It was like holding our own feet to the fire. We could have been badly burned" (Darrach, 1993, p. 64). Happily, in its second season, the show's ratings began to improve, and in its fourth season, *Cheers* had popped into the top ten. For the rest of its seven seasons, it would remain there, never more than four shows away from the top, and frequently the number one television show in America. At the end of its impressive run, *Cheers* had aired 275 episodes during eleven seasons, won 26 Emmies, and obtained a record 111 Emmy nominations.

Timing also contributed to the success of *Cheers*. In the time of slapstick and even crude comedies, such as *Three's Company*, *Cheers* was one of the first television shows to break this comedic mold, to get television out of the rut of the seventies in which it seemed to be stuck.

The Characters

To understand *Cheers*, you must understand its characters, who are the *bar regulars*. These barflies include Sam Malone, Norm Peterson, Clifford Claven, Carla LeBec, Woody Boyd, Rebecca Howe, Frasier Crane, Lilith Sternin-Crane, Diane Chambers, and Ernie Pantuso.

Sam Malone

Sam Malone, played by Ted Danson, is the owner of *Cheers* and the central character of the show. His parents were Irish immigrants and he was brought up in humble surroundings. Sam's big break came to him during his senior year of high school, when he was recruited to play class A baseball for the Boston Red Sox. He left high school and joined the team as a relief pitcher for only a few years. He ended up an alcoholic. After his recovery, he bought the bar. Sam Malone casts a vision of a classic male chauvinist playboy.

Norm Peterson

Norm Peterson (George Wendt) may be one of the funniest characters on all of modern television. Once an accountant, and then a painter, he now is professionally unemployed. His whole life is the bar, living vicariously through Sam Malone, and making *Cheers* his home. "Every night he bellies up to the bar with a froth of beer, making notes on what fools these mortals be. Norm's one-liners have become so popular that they have been collected and are known as "Normisms."

Clifford Claven

Clifford Claven (John Ratzenburger) is the bar know-it-all. There is not a subject in this world on which he is not an expert. He is an encyclopedia of irrelevant information and misinformation. A forty-seven-year-old mailman, Cliff still lives with his mother in a tiny apartment.

Carla LeBec

Carla Tortelli (Rhea Perlman) is a survivor. After going through at least two husbands, countless lovers, and eight kids, she is outspoken and honest, but not mean. Carla isn't afraid to say things that most people would love to say, but do not. Everybody likes Carla even though she never runs out of venom. Perlman explains, "It's such a pleasure to hear somebody say all the vicious things you don't have the guts to say yourself" (Burrows, 1990b).

Woody Boyd

Woody Boyd (Woody Harrelson), Sam's bartending partner, "must have sucked on the seltzer nozzle until-wheeeeeee!-all the bubbles went to his brain" (Darrach, 1993, p. 62). Woody is naive and childlike. From a small farm town, he is a country hick who is just happy to live in the city.

Rebecca Howe

Rebecca Howe (Kirstie Alley) is the manager of *Cheers*. She came into the bar as a no-nonsense business women, and like others, soon became a useless, pitiful blubbering mass of her former self. She used to have responsibilities, importance and demand respect, but she now is reduced to carrying a cigar box full of receipts around. She's a money junkie who just wants to marry a rich man so she can goof off the rest of her life.

Frasier Crane

Frasier Crane (Kelsey Grammer) "is a shrink who shrank" (Darrach, 1993, p. 63). Originally, he came into Cheers as an accomplished and renowned psychiatrist, and as Diane Chamber's new boyfriend. However, Diane left him, he developed a drinking problem, and his reputation tumbled. To pay off his overdrawn bar tab, he ends up scrubbing *Cheers*' toilets.

Frasier is pompous and inept, yet longs to be "one of the boys." He marries Lilith Sternin-Crane, regains his reputation and career, and remains an outstanding and influential member of Boston society. He takes it upon himself to introduce culture, knowledge, and literature into the bar.

Lilith Sternin-Crane

Lilith Sternin-Crane (Bebe Neuwirth) is Frasier Crane's wife, and a physiotherapist. With pitch black hair and absolutely no skin pigment whatsoever, most would say that she should come with a set of bat wings. However, actress Neuwirth says, "There's something sweet about Lilith. She just doesn't know how to be with people" (Darrach, 1993, p. 62). Unlike the rest of the people who walk into Cheers, Lilith is not sucked into their world of idle thoughts, beer, and stupid ideas.

Diane Chambers

Diane Chambers (Shelly Long) came to *Cheers* as a stop off and remained at the bar for five years, becoming a waitress. A perpetual college student, she attempted to *civilize* the bar patrons, but to no avail. As the first intellectual in the bar, she is noticeably out of place, and is frequently the butt of the others' jokes. Throughout the time in which Diane was at *Cheers*, she and Sam were mad about each other, but not made for each other. She was " a culture snob in graduate school," and he was "a galoot who had wasted his youth on the mound" (Darrach, 1993, p. 59).

Ernie Pantuso

Ernie Pantuso (Nick Colasanto) was Sam's baseball coach when in the major leagues, and holds the record of being hit the most times in the head by a pitch. He

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becomes the bartender at Cheers. Nicknamed "Coach," he is a good listener, very sweet, and longs to be smart.

General Analysis

Once the characters are understood, then the structure of this television comedy can be examined in greater detail. When television comedy is being analyzed, the majority of programs fall in to one of two major humor categories, slapstick and intellectual.

Slapstick is basically humor at the expense of others. The jokes are not necessarily tasteful, and the only thing that they are really good for is a cheap laugh. Examples of slapstick humor includes *Rowan & Martin's Laugh-In* and *Three's Company* during the seventies. In general, slapstick humor requires no thought. The joke does not have to be turned over in the mind to understand it, but rather it receives an instantaneous response of laughter.

On the other hand, intellectual humor consists of jokes that require some deliberation, and some degree of intelligence to understand. They are not common jokes that are used until they become clichés, but are original and fresh. The writers of these jokes take great care in their structure, and it is important for them to be well-written and contrived.

The audience of intellectual humor is very different from that of slapstick humor, for intellectual jokes are directed at the thinking person. Many of these jokes allude to literature, historical events, and current happenings. Interestingly enough, when a viewer of slapstick watches a program that incorporates intellectual humor, the majority of the jokes go uninterpreted, and are not understood.

Therefore, one must wonder why the writers of *Cheers* would use intellectual humor since it is so much more involved. The answer is simple: the rewards are greater. *Cheers* could reach millions of people every week and did the toughest thing there is to do; it made them laugh. The rewards of using your mind to watch television rather than using your eyes is something that the writers of *Cheers* caught on to. When a member of the viewing audience understands a joke, not because it is painfully obvious, but by drawing upon accumulated knowledge to understand it, the viewer finds happiness in his or her own intelligence. This changes the viewer from being someone who is passively watching, to someone who is actually involved in the show, and able to laugh with the characters. This intellectual transportation from the audience to the show itself is what makes *Cheers* great. A testament of the success of *Cheers* is illustrated by noted author Kurt Vonnegut's statement that *Cheers* is a comic masterpiece, which he would rather have written than all of his other works combined, because each line is significant and funny (Bianculli, 1992).

Cheers draws on a number of intellectual resources to make it funny. The writers employ intellectual humor in many different ways. The use of intertextuality in *Cheers* is its life blood. *Cheers* uses intertextuality in the form of literary and cultural allusions, drawing upon the visual aspects of the program to enhance the meaning. This makes *Cheers* a comedy of thought, rather than actions.

Tertiary texts are those produced by the viewers. "Tertiary texts occur at the level of the viewer and his/her social relations. Studying them gives us access to the meanings that are in circulation at any one time" (Fiske, 1987, p.117). In the case of *Cheers*, this is best examined through electronic discussion groups available on the Internet. *Cheers* became one of the very early programs to have an electronic discussion group, specifically a listserve connected with the series. *Cheers* fans from around the world could comment on issues of interest to them. Thus *Cheers* pioneered this genre of discussion. Unfortunately *Cheers* came to an end before the influx of electronic newsgroups. Today, electronic discussion groups exist *for Rush Limbaugh, David Letterman*, and situation comedies such as *Sienfeld* and *The Simpsons*. However, searching the Internet still can reveal generic *Cheers* trivia, sound, documents such as Norm quotes, and episode guides. The importance of these secondary or vertical intertextual documents is that they circulate selected meanings of the text.

Cheers is unusual in that it seems quite immune to contemporary events. Existing from 1982-1993, it makes no references to major issues of the day such as the Gulf War and the U.S. presidential elections of George Bush or Ronald Reagan. *Cheers* did not coexist in the real world. Oddly, however, *Cheers* existed in the same universe as other television programs. Characters from other shows have appeared on *Cheers*, or vice versa. Examples include Carla going to St. Eligius Hospital from *St. Elsewhere* to deliver her baby, or Norm and Cliff taking a fishing holiday on Sandpiper airlines from the television series *Wings*.

On the other hand, *Cheers* has been established as not belonging to other universes. This is accomplished by having other television shows appear prominently on *Cheers* in the role of television shows. These television shows include *Spencer for Hire*, *Jeopardy*, the *Tonight Show* with Johnny Carson and the *Arsenio Hall Show*. *Cheers* most definitely co-exists in a world of pop culture and real culture.

Episode Analysis

To illustrate the role of intertextuality in *Cheers*, a number of episodes can be analyzed to show how the use of intertextuality makes *Cheers* even more humorous. The evolution of the characters occurs gradually, and patterns of change emerge from season to season.

Show Down, Part 1 of 2

The first such example is of a character trying to bring culture into the bar setting is seen in the episode *Show Down, Part 1 of 2*, (Burrows, 1983a). Here, Diane told the bar patrons there was "something extraordinary" on the television. The barflies quickly surrounded the television expecting to see a hockey game, or something similar. They were surprised to see Wagner's *Das Rhiengold* in front of them. They were about to go back to their beer and idle chatter, when Diane insisted that they watch at least ten minutes of it. They agreed to do so, but gave up with a groan in a matter of seconds.

On *Cheers*, only Diane was aware of this television event, and was determined to have the bar patrons watch it. In this attempt, she was unsuccessful in enlightening them. Were this the only incident of cultural intertextuality, we would think nothing of it. However this was followed by many more intertextual references to culture, literature, and even intelligence. During the first season of *Cheers*, the only cultured character in the bar was Diane, who persisted in trying to make the barflies appreciate culture although she was largely unsuccessful.

Homicidal Ham

The episode *Homicidal Ham* (Burrows, 1983b), intertwines play acting with reality. Diane made the mistake of trying to help an ex-convict with his dream of becoming an actor. Once convicted for murder, Andy Andy attempted to rob *Cheers* so he would be sent back to prison where he was more comfortable. Diane helped him pursue his dream of acting by guiding him in presenting a scene from William Shakespeare's *Othello*, which could lead to a job if Andy Andy performed well enough. Before Andy and Diane present the "strangulation scene" from *Othello*, Andy confessed that he loved Diane. Diane believed that he only meant this as a friend. Yet when Andy witnessed Sam giving Diane a good luck kiss, his jealousy overpowered him, and he vowed to kill her in the scene. Diane realized this while introducing the scene during its presentation to the bar patrons. She attempted to stall, but to no avail, and mid-way through the scene, Andy began strangling Diane. The viewers believed it was part of the play, until Diane screamed for help, at which point, Andy was restrained.

This episode of *Cheers* is especially important because it exhibits dual content intertextuality. Not only is the scene from *Othello* being acted out in the episode, but the episode itself runs along a similar theme of *Othello*, and includes love, deception, and vengeance. In this episode, Diane was not only attempting to help a fellow human at reestablishing his life, but in the process, she was also introducing Shakespearean theater to the bar. The patrons were willing to miss their boxing match on television in order to watch Diane and Andy's presentation, which was received with little complaining or sarcasm. Diane's attempt to introduce Shakespeare to the audience of barflies is best summed up in Diane's introduction of the play and Cliff's response, "Now, I know I don't have to explain the play to Professor DeWit, but it might be helpful, to some of you, if I explained what you're about to see." "Duhhhh, I wun-der who sheeee's tal-king a-bout Nooorm? Duheehuh" (Burrows, 1983b). In earlier episodes, such as "Show Down, Part 1 of 2" (Burrows, 1983a), the bar patrons would not even give Diane's suggestions a chance, but now they were willingly watching *Othello*.

Old Flames

In the next example, *Old Flames* (Burrows, 1983c), Diane attempted to reveal to Sam the pleasures of art, and took him gallery hopping. When she told the barflies that "Mr. Malone is on his way to developing an appreciation of non-representational art" (Burrows, 1983c), they were doubtful of course. To test him, Carla asked Sam to name any piece of art that he saw. When this was met by silence, she asked him to name any piece of art in the world. To the everyone's surprise, Sam actually provided an answer, "Michaelangelo's two muscular guys touching fingers" (Burrows, 1983c).

This example of Diane's continuing quest to widen Sam's appreciation of culture, was met more or less halfway. Sam went to the art galleries with her, with no complaint. The *old* Sam would never have been done that. Unfortunately for Diane, not much of her work actually sunk in, but it was evident that she was slowly getting the bar patrons to appreciate, or at least not complain about art and culture. Humor also lies in the fact that Norm and Cliff thought Sam's answer of "two muscular guys touching fingers" (Burrows, 1983c), was correct.

Bar Bet

In the episode *Bar Bet* (Burrows, 1985), Norm and Cliff are seen having a heated debate about Anton Checkov and Henrick Ibsen. Norm said, "It was Checkov Cliffy, I can remember what it was, it was the Cherry Orchard," and Cliff replied, "You're full of it Norm, it was Ibsen and the Masterbuilder" (Burrows, 1985). Diane was amazed and somewhat flattered that they were having an inquiry of such a caliber, and offered to help. They agreed and Cliff asked Diane if she remembers what she was watching on television "that night that Norm stuffed his face with cheese doodles and whistled *The Way We Were*" (Burrows, 1985). Diane was disappointed and answered "Ibsen. And it was taco chips" (Burrows, 1985).

This vignette reveals that the bar patrons whom Diane attempts to enlighten are retaining some of her attempts at cultural improvement. Much to the chagrin of Diane, however, they are remembering the wrong things.

For the first few years of *Cheers*, Diane Chambers was the only cultural and intellectual influence in the bar. Because of this, her goal to make Cheers a *cultured* bar had little chance of being fulfilled. However, in the show's third year, a second cultural influence came into the bar, in the form of Diane's boyfriend Frasier Crane. An increasing number of people of a *higher class* than the regular barflies began to frequent the bar, including Lilith-Sternin Crane, and Robin Colcord, Rebecca Howe's billionaire boyfriend. Thus, the cultural and intellectual awareness of the barflies exhibited a more pronounced change.

Feeble Attraction

The episode *Feeble Attraction* (Burrows, 1989), brings into focus, the bar patrons' value of material worth over historical and cultural value. Robin Colcord sent Rebecca an antique desk as a gift. With it he enclosed a note saying that there was a secret hidden in the desk, but he would not reveal it. He merely gave a one-word hint, *ring*. Rebecca interpreted the message to mean an engagement ring was hidden somewhere in the desk, and in her excitement, began dismantling the desk piece by piece. Later, a message arrived, stating that the desk had been authenticated as having belonged to George Bernard Shaw. After Shaw completed the novel Man and Superman, he rested his teacup on the desk, where it left a distinct mark, and henceforward became known as the ring desk. To this discovery, Sam has only one question, pertaining to Man and Superman, " I wonder if that's the one where he fought the mole people" (Burrows, 1989).

This example illustrates that many of the barflies did not understand the value of history and they were only concerned with materialism. When they discovered that the desk was worth thousands of dollars, they tried to stop Rebecca before she inflicted any more damage on the desk. The bar patrons did not yet appreciate the historical value of culture.

Fifty-Fifty Carla

The *Fifty-Fifty Carla* episode (Burrows, 1990a), focuses on Woody's need to prepare a presentation for a simple audition and the resulting cultural one-ups-manship that ensues. Frasier and Robin, suggested various possibilities for a performance. Frasier suggested a dramatic monologue, such as *Cyrano De Bergerac*. Robin does better by suggesting Richard II, and quoted a passage from it. The bar patrons were impressed, and Frasier not wanting to be outdone, quoted a segue from *Cyrano*. Robin was about to defend himself by producing yet another quotation and a literary brawl could be felt brewing between them. But Woody interrupted them, saying that he would just go with what he had thought of in the first place, and put his head between his legs, locked his arms around his legs, and waddled out of the bar.

This episode reveals an evolution of the barflies as appreciative of great literary works. Rather than scoff at the recitations by Frasier and Robin, which would have been the case earlier on in the series, they were now impressed by this feat.

Get My Act Together

In the episode *I'm Gonna Get My Act Together And Stick It In Your Face* (Ackerman, 1991), Frasier was shocked to learn that the gang has never heard of Charles Dickens. He discovered this when Rebecca had broken up with Robin Colcord, and was moping about the bar in her wedding dress. Frasier remarked that "her walking around in that wedding dress was just a tad too Miss Havisham." (Ackerman, 1991), thus prompting an inquiry as to whom he was referring. Frasier explained that Miss Havisham was a character in Charles Dickens' *Great Expectations*, and he was drawn aback to realize that they had no idea what he was talking about. "Surely you know... *Great Expectations*... Pip, Miss Havisham, Magwige... and four pizza-loving turtles who practice martial arts in the sewers" (Ackerman, 1991). Frasier could not believe that they really had no ideal who Charles Dickens was, and asked them "are you really this ignorant, or do you just do this to torture me." and it was met with Norm's reply, "Sometimes the two go hand in hand" (Ackerman, 1991). Realizing that the barflies had never been exposed to Charles Dickens, Frasier took it upon himself to read them *A Tale Of Two Cities*. However, by the first two lines, he sensed that the gang was supremely uninterested, and changed the plot to cater to their likes. "There was a king with a large jaw, and a queen with a fair face on the throne of England... and there was a blood-thirsty clown who beckoned innocent children into the sewer and swallowed them whole" (Ackerman, 1991). Frasier had adjusted Dickens' famous classics so that they would be relished by the mostly uncultured crowd. By the end of the episode, he had them chanting "Dickens!" and asking for more.

This episode illustrates that the barflies did not have a grudge against high culture, but they merely disliked the way it was commonly delivered. *Cheers* had not butchered a famous classic, but instead it had actually managed to present it in a style accepted by the bar audience. Therefore, culture otherwise out of grasp, was now within their reach.

Baby Balk

The episode *Baby Balk* (Burrows, 1991), brings a team of bowlers to the bar, proudly boasting that their friend had just bowled a 300 game. They were extremely jubilant, and one of them was even handing out cigars to all the men in the bar. Accidentally, the bowler gave a cigar to Lilith, and realizing his mistake, he apologized. Lilith replied, "You think that because I'm a woman I won't enjoy this? I'll save it for the George Sand film festival." (Burrows, 1991). The bowler was somewhat confused, and Frasier attempted to clear him up by stating, "What you don't understand is that my wife just made a very funny literary reference to a woman that used to dress as a man and live in France." The bowler asks, "Was he a bowler?" to which Frasier replies, "Sure, what the hell" (Burrows, 1991).

This segment emphasizes that whereas some people who frequent the bar, such as Frasier and Lilith, are of high culture, others will just never be able to understand them completely. The bowlers' attitude toward culture was similar to that which dominated *Cheers* at the beginning of its first season.

Cheers and Cultural Intertextuality

These episodic examples have illustrated that the common barflies have slowly risen

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to a higher level of cultural awareness, with the aid of external cultural and intellectual influences. As isolated incidents, these segments would not have any effect of raising *Cheers* to the level of an intertextual *tour de force*. It is when incident after incident is examined, that one realizes that the authors' cultural commentary is not accidental, but most definitely intentional.

Yet another level of this intertextuality can be gleaned from an examination of the titles of the episodes. Again and again, they reflect *high culture*. Examples are: *Norman's Conquest* which refers to the *Norman Conquest of 1066*, *The Coaches Daughter* which refers to Pushkin's *The Captain's Daughter*, and *The Peterson Principal* which refers to the famous management motto known as the *Peter Principal*. The *Peter Principal* states that one is promoted until one reaches one's level of incompetence. This is the theme of the episode in which Norm and an Ivy-leaguer compete for the same promotion. Both *The Book of Samuel* and *Honor Thy Mother* have biblical connotations. *Puddin' Head Boyd* refers to the Mark Twain classic *Puddin' Head Wilson*. *Crash of the Titans* is a play on the movie *Clash of the Titans*.

Cheers in Comedic Perspective

In the vast sea of television comedies, one wonders where *Cheers* really fits. Commercial television has engaged in four distinct types of comedy (Inge, 1978). The earliest was the comic personality, such as Gracie Allen or George Burns, with the *Burns and Allen Show*. Next, there developed situation comedies, such as *Leave it to Beaver* or *Donna Reed*, wihch were generally viewed as basic puritanical moralisms sprinkled with mild doses of fun. During the late 1950s, a third type of comedy emerged, which generally employed slapstick humor and characteristically poked fun at authority symbols, such as the law, or the banking profession. This type of comedy is embodied in shows such as *The Real McCoys* and this genre peaked in the 1960s with programs such as *Car 54 Where Are You?* and *Gilligan's Island*. The fourth type of comic television began to dominate in the late 1960s and 1970s. This type included *The Mary Tyler Moore Show*, and *All in the Family* which incorporated the style of the much earlier *Dick Van Dyke Show*, with more social and political humor. Their substance was probably made possible by the pioneering style of the Smothers Brothers' social and political humor on CBS (Inge, 1978).

Cheers is not truly a personality comedy, nor does it supply the puritanical morals and the good natured family fun of the comedic second type. One might be inclined to group it with the slapstick shows based on its surface appearance, but a close examination eliminates that category as well, primarily due to its references to *high culture* and intertextual allusions. Nor does *Cheers* poke fun at authority figures or people of power, although it does occasionally satirize and poke fun at cultural snobs. *Cheers* is most in its element when grouped in the fourth category, but oddly enough, it does not display any of the political humor so typical to this genre. It does however display social humor, in the clash between bar and culture.

Cheers is set in Boston and is stocked by a microcosm of American society. The characters of the show consist of a mix of cultural and ethnic backgrounds, but are predominantly Irish, Jewish, Italian, White Anglo-Saxon Protestants, blue-collar workers, white-collar society, innocent farm types, and intellectuals. All are exaggerated through the visual and textual representations, thus playing upon cultural stereotypes that are recognized by the viewing public.

Thus, *Cheers* can not be placed wholly in one category of television comedy. It is a blended style, including some of the third genre of slapstick and authority mocking, mixed with a majority of the fourth genre, of the political and social satires. In that respect it most resembles *Mash* with its central characters placed in a home-away-from-home, sharing intimate situations through daily contact and familiarity, mocking authority, and incorporating some high culture while at the same time making the culturally elite the butt of everyday jokes. Both *Cheers* and *Mash* make cultural and political statements, although politics are much milder in *Cheers* than in *Mash*.

When all of the intertextual references within *Cheers* are examined, it is evident that they serve a higher purpose than just to make us laugh. Thus, the show goes far beyond a simple, mindless comedy targeted at passive viewers. The intertextual references raise the intellectual level of the program, make it stand out in the vast sea of pre-molded situation comedies, and present an active mental challenge to viewers. Those who possess the background, cultural knowledge see many references to literature, history, and popular culture within the programming.

While *Cheers* can be enjoyed at any level of viewing entertainment, it is particularly stimulating when the influences of other texts are recognized and understood. Further, the visual stimuli that are employed go hand-in-hand with the verbal banter, thus creating a very interesting and intermingled set of challenges for the mentally-alert viewer who attends to the variety of intertextual messages. Certainly, the variety of cues lead to greater understanding for the intelligent viewer, thus revealing the tremendous talent employed in creating the *Cheers* series.

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A Preliminary Study on Children's Understanding of a Visual Used in Television Interviews

by Georgette Comuntzis-Page

Abstract

This study examines children's interpretations of a visual convention used in television interviews and incorporates as a framework Flavell's theory of the developmental sequence of understanding television (1990). Thirty-four children were individually shown a videotape of two people talking in an interview on a television news program. The child answered questions about who sees what and what's "really and truly" happening in the visual. The researcher also engaged the child in a task which determined his or her level of perspective-taking ability and his or her idea of what people look like when they talk to each other in three-dimensional, real-world situations. Performances revealed age to be significant. Other factors (sex, perspective taking, and understanding conventions of conversation in the 3-D world) were questionable. The researcher speculates that using a different videotaped segment would yield more significant results. Findings relate to previous studies by Comuntzis-Page (in press) and others on children's interpretations of television's formal features. Findings also pertain to the work of Flavell and other developmentalists on perspective taking and appearance-reality phenomena.

This study is the latest attempt in the author's quest to discover the progression of young children's comprehension of the forms of visual media. Content has been and continues to be a concern of those who try to flesh out the effects television has on children. To date, however, few conclusions have been reached about the direct effects of such content on children. Understanding how young viewers comprehend a medium's forms rather than its content lays a more fertile ground on which to conduct studies which try to reveal the intricacies of the young child's relationship to visual media.

When children are very young, they begin to interact with the signs and symbols within the visual-spatial realm of knowledge. They understand spatial concepts and visual forms in ways which change as they grow. Television is an omnipresent source of visual-spatial information for many young children. Research in the fields of visual communication and child development shows that as young viewers mature, they understand the conventions of visual media, their formal features, in ways which often are different from adults. The purpose of this study is to examine how and when young viewers begin to understand a relatively new visual used in television interviews.

Traditionally, producers of television interviews have incorporated the filmic dialogue convention in which two people are shown conversing by using the long-shot (LS), over-the-shoulder (OS) of one person to the other, close-up (CU) of the person whose back was to the audience in the OS, followed by another CU of the other person. Visual communication scholars (e.g., Monaco, 1977; Zettl, 1990) explain that this sequence of shots engages viewers and allows them to see what is going on from various points of view. Zettl (1990) defines the index vector, an invisible line, which connects two people who are facing each other. In his textbooks, he instructs students of television production to keep camera on the same side of the vector line to ensure that viewers are not confused by the space being depicted (in press). As a result of these subtle cues, viewers have an understanding of the connection between the two people who are conversing.

Paying attention to vector lines and using the sequence of shots in dialogue scenes are conventions which are well-established in the world of film and television production; however, another technique has emerged in television interviews in which two people, actually in two different spaces (e.g., one is in his office, the other outside the building), converse. Even though they are separately framed next to each other on the television screen and look directly into the camera (not at each other), sophisticated viewers "buy into" the notion that the two people are engaged in conversation just as if they were in the same room. How is it that viewers see the two people talking to each other? Visually, what happens to the index vector between the two people as they look into the camera to speak? Do naive viewers know that the people are talking to one another or do they think that they are only addressing the viewers? (Actually, the two people are not talking exclusively to the viewers; they really are carrying on a conversation with the other person.) Do young viewers know that the two conversing do not see each other and that they only appear to be in the same space as they talk to each other?

Developmental Issues

Researchers have tried to relate the two fields of child development and visual communication by studying children's comprehension of televised reality (e.g., Condry & Freund, 1989; Dorr, 1983; Hawkins, 1977; Jaglom & Gardner, 1981). Findings from studies such as these have informed us only about children's comprehensions of the far away referents, not the objects on the screen.

Relating more to the idea of depiction, Wright, Huston, Reitz, and Piemyak (1994) address the appearance-reality distinction in their examination of children's ability to determine the "factuality and social realism" judgements of 5- and 7-year olds' favorite television programs. The researchers found that children determined a program's factuality by its genre and that they decided what type of genre a program is by its formal features and its content. Age and vocabulary scores were found to be significant factors in how well children knew about the program's factuality; social realism was closely related more to children's viewing history than to age and vocabulary.

Other investigations have looked at the form of the visuals (e.g., Smith, Anderson, & Fischer, 1985; Calvert, Huston, Watkins, & Wright, 1982; Singer & Singer, 1981; Wright; & Huston, 1983). Their results show that age is the most important determinant in how children relate to various forms. Although these studies are significant, none has isolated a single production technique.

There have been studies done in which the researchers focused on form more specifically by using production techniques, one by one, in their investigations. Salomon (1979) tested 7-year-old children in a study which showed that different camera angles could supplant children's mental capabilities. Acker (1981) looked at the types of lenses (long, short or normal in children's interpretations of velocity. Acker and Tiemens (1981) compared the use of zooms and cuts to see how young children interpreted an image of a candy bar. Kipper (1985) determined viewers' perceptions of objects shown by using different types of camera movement. Comuntzis (1987) investigated a younger sample, 3- to 6-year-olds, to find that children around 5 years old, who have spatial ability (operationalized by their performances on a three-dimensional perspective-taking task), have an understanding of the different viewpoints of actors who are depicted in a dialogue scene. These notable studies look at one type of production technique and relate it to aspects of child development to determine children's comprehension of that form. As a result, they offer insight into the child's concept of the representation of reality in visual media.

Television Interviews

The theory of John Flavell and colleagues offers a framework for understanding the ways in which children comprehend the visual forms of television interviews. Flavell and colleagues have looked at perspective taking and appearance-reality (e.g., 1986, 1989, 1990) and continue to elaborate upon these two theories. According to Flavell and others, children begin to understand that what they see is different from what others see in different viewing positions (Level 1 perspective taking). Later, they develop a higher level of understanding by recognizing that an object can appear different to different people (Level 2 perspective taking). The researchers state that a related form of understanding is the appearance-reality distinction in which children at certain ages, depending on the type of task determine that an object may seem different from the way it really is (Flavell, Green, & Flavell, 1989).

In another study, Flavell and colleagues related their theories to television by examining 3- and 4-year-olds' understanding of images depicted on the screen (Flavell, Flavell, Green, & Korfmacher, 1990). They found 3-year-olds made mistakes when asked whether a bowl of popcorn shown on TV would spill if the television set were turned upside down; many said yes. The researchers determined that these 3-year-olds did not think that the bowl of popcorn was actually inside the set. Rather, children's responses indicated a basic lack of cognitive ability to separate the image from the object it represented (its referent). The findings suggest that understanding televised images is related to the ability to discern different perspectives and to differentiate between objects which are real and those which appear to be real (Flavell, Flavell, & Korfmacher, 1990). When children start understanding the nature of representing objects two-dimensionally, that is, their depictions, they may begin to understand other aspects of their televiewing experience.

Out of this line of research, Flavell and colleagues (1990) have proposed a 4-step developmental sequence of children's understanding of television reality. A child is at step 1 when he or she does not distinguish between real objects and those which are depicted on television. The child at this first step has no concept of the things a depicted object can do or have done to it: Its "affordances" (Gibson, 1979) are unknown to the child. For example, children at this step think that people portrayed on television can actually talk to them, hear them, and really see them.

Step 2 is characterized by the child's knowing that what's on TV does not necessarily behave like ordinary objects, that the viewer cannot touch, for instance, or that the objects cannot fall out of the set. The child does not know, however, that the objects refer to objects or events not present. To them, what they see on television is not a representation of something else. Therefore, questions about reality-affordance are not clear to them. For instance, they go back and forth in their answers about whether people shown on the screen in two separate boxes are actually talking to each other.

In step 3, children know that images are depictions of an absent reality. They think that these depictions, however, are faithful to the reality of the object in its portrayal. Referents are always exactly as they seem or appear to the televiewer at the third step of understanding. An example would be the child's seeing two people who are facing the camera and thinking that the two people cannot really see each other.

Finally, children at the last step understand that objects on television can be portrayed realistically or unrealistically, regardless of their referents. For example, they know that the camera manipulates objects to seem like they are doing things that are not possible in the real world-two people framed next to each other, but in reality, not in the same space.

Thus, Flavell's sequence of steps toward children's understanding of television provides a framework for studying their interpretations of specific production techniques. How does this progression of children's understanding relate to their comprehensions of the visual used in television interviews?

Method

Subjects. Thirty-four children (13 girls, 21 boys) were drawn from preschools and child care facilities in a small university town. Their ages ranged from 3 years, 3 months to 6 years, 8 months, with a mean age of 5 years, 1 month.

Procedure. Children were tested separately in a room in their preschool or child care facility. The researcher introduced herself and talked to the child about they were going to do. If the child refused to participate, he or she went back to regular activities. Only three children refused.

All children were given two tasks. In the first task, the child sat in front of a TV/monitor and watched part of a local news program in which two people talked to each other.

The stimulus for the interview was a segment of a news program aired locally. It begins with a close-up (CU) of a man, Bill, telling a news woman, Jennifer, about pelligrens

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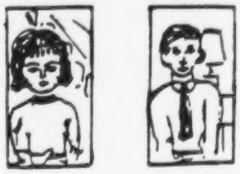
and how they can be seen in the community. The CU of Bill is followed by a shot of Bill and Jennifer framed separately on the screen. (See Figure 1.)

Figure 1

TELEVISION INTERVIEW



They talk to each other, yet they look straight into the camera as they are shown in two different spaces situated next to each other on the screen. The backgrounds for each reveals Bill is in his office or home and Jennifer is in some part of the studio, where there are several monitors. Jennifer asks Bill to describe the situation of the pelligrens. He proceeds to do so as Jennifer smiles and looks at the camera in her separate space. The segment ends with Jennifer thanking Bill for sharing the information. As the camera goes back to the studio desk, the researcher stopped the tape.

In order to preserve ecological validity for televised images viewed by the child, the researcher let the child see the segment all the way through before he or she watched it with stopped frames to answer questions about the frozen image. During the testing, the researcher stopped the tape at the point when Bill and Jennifer are shown at the same time. Using Flavell's method for testing the reality-appearance distinction (Flavell, Green, Flavell, 1989) and Comuntzis' method for assessing children's level of perspective taking in a televised dialogue scene (1987, 1991), the researcher asked the child questions about different points of view, followed by questions about the child's understanding of the actual and apparent conversational aspects of the interview. For example, to test the level of perspective-taking ability, the child answered questions about what they saw and what Bill and Jennifer saw such as, "Do you see Bill?" (Level 0). "Does Jennifer see Bill?" (Level 1). "Does Bill see Jennifer's red shirt?" (Level 2).

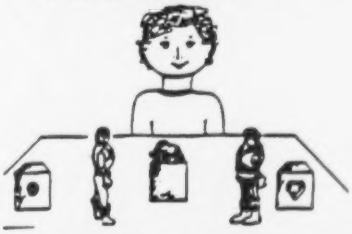
To test the reality-appearance distinction, the researcher asked questions such as, "*Really* and *truly*, is Bill talking to someone?" "Who?" "*Really* and *truly*, is Jennifer in the same room as Bill?" "Does it look like Jennifer and Bill are in the same room?" "Where is Jennifer?" (The words "really and truly" were used in Flavell and colleagues 1989 study on appearance-reality.)

The second task included the table task used in previous studies by Comuntzis (1987, 1991) in which levels of perspective taking were determined; however, this study used different dolls. Instead of He-man and Captain America, dolls from the current popular television series, Mighty Morphin Power Rangers, were used. The child sat in a chair across from the researcher at a table which displayed Zack and Kimberly, two Power Rangers, situated near blocks with stickers of familiar objects on the sides. The two characters looked at a middle block on which a toy elephant faced Kimberly. (See Figure 2.)

The child and interviewer first talked about the objects--the names of the characters, the names of the objects portrayed in the stickers on the sides of the blocks, the parts of the elephant--in order to make sure the child understood all the terms used in the questioning. The display was fixed so that the seated child saw one side of the blocks and one side of the elephant. The child never had to remember what objects were not within his or her view since the researcher reminded the child where the objects were.

Figure 2

TABLE TASK DISPLAY



Questions were asked to determine the level of perspective taking for each child. Level 1 is characterized by the child knowing that what he or she sees is different from what another person in a different viewing position sees. "Do you see the elephant?" and "Does Zack see the elephant?" are questions which test this first level. A child is at Level II when he or she knows that a person may see the object

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differently from him or her; that is, they can determine the quality of differences in varied points of view. For instance, "Does Kimberly see the sides of the blocks that you see?" is a question which reveals whether a child is at this second level. The third level of ability is reached when the child knows what an imagined viewpoint is like: "Let's pretend that Kimberly sits down on the table right where she is. Does she see the heart sticker?"

The researcher ended the table task by bringing out two finger puppets (Zack and Jason, another Power Ranger) placed on pencils. She asked the child to "fix the two finger puppets to make them look like they are talking to each other." She then let the child move the puppets to turn them any way he or she wanted them to be. After the child did this, the researcher took the puppets back and fixed them to face the child, not each other, and asked, "What if I do this." (fixing the puppets next to each other, both facing the child). "Can Jason and Zack talk to each other now?" When the child answered, the table task ended.

Scoring. Children were placed at one of the four steps of Flavell's (1990) developmental sequence according to how well they answered questions about the interview visual. They were judged to be at a certain step by their answers on the questions about the different perspectives in the video and about what they thought was really or apparently true. Other variables included their age, sex, whether they thought that people, in three-dimensional situations, could talk to each other if they were not facing each other, and their level of visual-spatial ability (demonstrated by their performance on the perspective-taking table task).

Children were judged to be at a certain step in understanding the interview visual according to Flavell et al.'s (1990) proposed developmental sequence of understanding television. If, in their answers and comments during the video task, children only thought that the two people in the video were really and truly talking to them or seeing them, then they were ranked at step one. According to the theory (Flavell et al., 1990), children who think that objects on TV can interact with them are at the lowest level of understanding.

Children were at step two if they were not sure of the affordances of the people in the video. Unlike those at the first step, these children where aware that the people on the video could not interact with them; however, they still were confused about what the people were doing, for instance, were they or were they not in the same room. If children knew that objects (people) were depicted on television, but they believed that the depictions were true to their referents, they were at the third step. Children at this step refer to the television and what's depicted in absolute terms, relying heavily upon their knowledge of what objects (people) can or cannot do in real-life situations. For instance, these children knew that Bill and Jennifer could hear each other even though they did not see each other.

Finally, the children who knew about television's capabilities in making depictions seem real or unreal were at step four in the developmental sequence. These children knew that the two people in the visual were framed by manipulating some kind of camera device, for instance, and that they could hear each other, not because they were next to each other in the same space, but because they were using some kind of mechanism which enabled them to carry on a conversation.

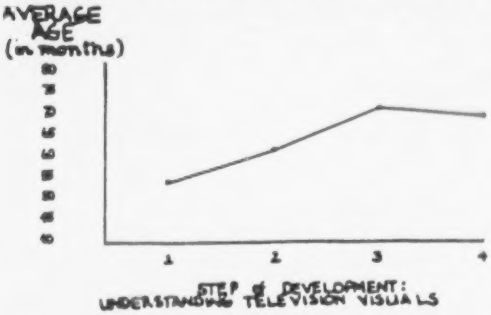
Results

The independent variables in this study included age, sex, perspective-taking level in the table task, and whether the subject thought that people, in a three-dimensional situation, could talk to each other when not facing each other. Of the independent variables used in this preliminary study, age was found to be the significant factor in determining the step of a child's progression toward understanding the visual on TV interviews. Groups of children at steps 1, 2, 3, and 4 were compared to determine at what age they begin to understand the interview visual. (See Figure 3.)

When children at step 1 were compared to those at the highest step (4), age was significant, $t = 2.5$, $p < .01$. The average age for children at step 1 was 54 months, or 4 years, 6 months, whereas the average age of children at step 4 was

Figure 3

AGES AND STAGES
OF
UNDERSTANDING TELEVISION



69 months, or 5 years, nine months. As well, when the second group of children was compared to the third group, age was found to be significant, *t* = -3.40, p< .01, with the average age for step 2 being 61 months, or about 5 years old; step 3 had a mean age of 71 months, or almost 6 years of age.

Other comparisons between groups of children at different steps showed that there were no significant differences between step 1 and 2 and between steps 3 and 4. Therefore, the first two steps were collapsed, as were steps 3 and 4, yielding age as significant, *t* = -3.03, p< .01. The average age of the children at step 1 and 2 was almost a year younger (57 months, or 4 years, 9 months) than those at the third and fourth steps (5 years, 11 months).

The most significant separation by age occurred between children at the first step and those at the third step, *t* = -3.40, p< .001. The average age of subjects at step 1 was 4 years, 6 months; that of the third step was almost 6 years old (5 years, 11 months).

One of the questions asked by this study concerned children's perceptions of whether the two people in the visual were talking to each other. Results were mixed: Eighteen out of 34 children said that the people were not talking to each other; sixteen said that they were. Children in the first step were most unsure about whether the people were engaged in conversation with each other. Most children at the lowest step said that the two people were talking to them and not to each other, a characteristic of the first step of development in the sequence of understanding television--that the objects on the screen could interact with the viewer. Even though they demonstrated their knowledge in understanding that the people in the visual could not interact with them and that the visual was a depiction of reality, most children at step 3 (six out of seven) showed that they were not convinced that the two people shown on the screen were talking to each other. (This finding may have been the result of the segment which was tape. That is, the two people did not engage in much back-and-forth conversation in the segment.)

Although not significant in separating groups of children at different steps, an interesting finding in the table task was that all children [n = 34], when asked to fix the two hand puppet Power Rangers (Zack & Jason) so that they were talking to each other, made them face each other. When asked whether Zack and Jason could talk to each other if facing out in the same direction (not toward each other), most of the children at the first step said "no" (10 out of 15). Children at steps 2 and 3 were equally divided on their answers. At step 4, however, most said "yes" (4 out of 5).

Subjects' levels of performance on the table task were not significant factors in this study: The average level of ability on the table task was 1.8, almost at the second level of ability.

Discussion

The relatively new way of depicting interviews on the news was the focus of this study, which uses Flavell's proposed developmental sequence of understanding television (1990) as a framework. The results show that the subjects in this study are around 6 years old when they begin to understand that the two people on the screen are depictions, that is, represent two people talking to each other in the same place even though, in reality, they are in two different places and actually can only hear each other.

At the third step, the children in this study are around 6 years old when they know that the images on the screen are depictions of what is real and not the actual object unfiltered through any other level of reality. This finding shows that the quality of this convention used in interviews presents more difficulty for children who are older than those used in other studies which examine the reality-appearance distinction (e.g., Flavell et al., 1989, 1990). The finding may enhance the findings of other investigations which look at reality-appearance of televised elements (e.g., Wright et al, 1994).

This study also addressed the child's perspective-taking ability in a three-dimensional situation. Children's perspective-taking knowledge did not play an important role in their understanding of this visual. This finding is predictable since the visual does not challenge the viewer's ability to know about different viewpoints: The visual shows no reverse-angles, only shots wherein two people look straight into the camera. Whether the visual is comprehended may relate more to the viewer's skill in knowing that what they see on television is a representation of reality, which can be manipulated by those who produce what is shown on the screen. The children who were at steps 3 and 4 understood that what they saw was a depiction of two people on television presumably talking in second-order space, or space which was one level removed from the "reality" of the live-action at the news desk.

Conclusion

A major problem with this study has to do with the stimulus tape used did not present the convention as accurately as it could have done. In subsequent investigations, another tape which shows the 2 people conversing for a longer period of time will be used. Because of the poor quality of the tape, results were somewhat inconclusive.

Nevertheless, looking at the results as exploratory, age is significant. Around 6 years of age, children in this study indicate an awareness that what they see on TV is not actually "there." This study also shows that children around 4 and a half years have not yet begun to know about the elements of the pictured conversation between two people framed separately but next to each other on the screen; they are confused about the immediacy factor and about what the objects they see on the screen afford them as viewers.

By focusing in on one type of televised depiction, this study contributes more information to the study of production techniques which may or may not present problems to young viewers. In future research, looking at this type of phenomenon from another point of view may be even more instructful. Messaris (1994) asserts that seeking to find the cognitive consequences of visual "literacy" is pertinent to our learning about the relationship between visual media and young viewers. Perhaps the theory of Flavell (1990) on the development of understanding television might be considered as an independent variable and, perhaps, give us more significant insights into such a relationship.

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Factors Affecting Children's Attention on TV Viewing

by Sophia T. Wu

Abstract

This study was conducted to investigate what and how pre-school children attend to children's TV programs. The secondary task method was applied to determine children's attention degree, and an in-depth interview was conducted to describe subject's memory type. Age difference, demographic area, and language familiarity were found to be significant factors that affect children's attention on TV viewing.

Introduction

For many decades, children's TV programs have been considered educational and expected to be an essential learning vehicle. The positive effects of children's TV programs have been investigated and demonstrated in a good deal of research articles (Welch & Watt, 1980; Howe, 1983, Mielke, 1990). Among the variables tested to be influential factors affecting learning outcome, attention has been investigated from many aspects and thought to be a critical pre-requisite leading toward content comprehension. Houston and Write (1983) suggest that fast-paced, high volume, special effects on audio and video track, etc. are elements that contribute to the unique format of children's TV programs. Such standard attributes then serve as attention cues which will direct children's attention (Cohen & Salapatek, 1975). Salmon (1977,1979) points out that in addition to the program content, the convention of TV language, such as camera movement and editing style, affect the activation of cognitive strategy of the audience. Furthermore, media perception, also known as AIME (amount of invested mental effort, proposed by Salmon, 1981;1983), is one of the factors that influences the amount of learning from TV. Investigating the influence of visual complexity on children's attention to children's TV programs, Welsh and Watt (1980) found that children's attention was positively associated with content recognition. In general, it is agreed that attention is one of the most predictive factors affecting the educational effect of children's programs.

Some of the recent studies on attention have shifted the research paradigm to the concept of "active viewer". Children are no longer passive objects waiting for information to swallow in without discrepancies. From mass culture theory, TV programs are products of cultural practice and ecological structure. Thus, macro factors, such as the culture and ecology related to the cultivation of a child, need to be explored in order to better understand how children react to TV content. In addition to the reflecting on the impact of social context on the audience, data collection from content analysis or experimental research design alone appears to be inadequate in interpreting the multi-facets of children's TV viewing behavior. Overall, experimental and quantitative statistical figures do help researchers understand "what" children focus on while watching TV. However, the more complete picture is still at large due to the lack of the qualitative data on "why" and "how" children are attracted to certain information. The present study attempts to fill the incomplete puzzle from different angles.

Method--The Secondary Task Method

Based on Kahneman's definition of operation, attention is defined as mental effort allocated to performing cognitive tasks. As the result of resource limitation of cognitive capacity, it is assumed that when much effort is assigned to one task, such as viewing television, performance on a concurrent task suffers (.Kahneman, 1973; Meadowcroft, 1996). According to Meadowcroft, an implication of Kahneman's theory is that attention can be measured as mental effort by a secondary task method that requires individual to perform two tasks simultaneously. Attention is associated with program appeal, which would lead to comprehension.

The purpose of the study was to investigate cultural and ecological factors which might affect children's visual attention to TV viewing and the nature of their immediate recall of content. The research design, including variables, subjects, stimuli, and procedures is described below.

Independent and Dependent Variables

Demographic variables such as gender, age, and living area were treated as independent variables. Age variable was devided into two levels: the 5-year-olds and the 6-year-olds. There were two categories of living area: urban and rural location. Attention index, the main dependent variable, was measured according to the observed record, which will be described in detail in the procedure section.

Another dependent variable, recall and the cues of recall, was not quantitatively defined, instead, qualitative data was collected through in-depth interview.

Subjects

Subjects were recruited from two kindergartens, one of which was located in the Taipei metropolitan area, the other was from a southern town—Tainan in the south of Taiwan. There were a total of 60 subjects, 30 of which were 5-year-olds and 30 were 6-year-olds. In addition to the age variable, half of the subjects were from the city and the other half, from the south. Details of the demographic information of subjects is shown in Figure 1.

Figure 1

Subject Demographic Data

Gender	
boy	n=30
girl	n=30
Age	
5-year-old	n=30
6-year-old	n=30
Living area	
Urban	n=30
Rural	n=30
Total	N=60

Stimuli

An edited segment from a Chinese preschool TV program named "Popcorn" was used as the primary source of information. In addition to the video, a set of color transparencies copied from a colorful children's book were used as the secondary task instrument. Both stimuli were 16 minutes in length.

Procedures

Each kindergarten had five trained observers for each section. In total, 12 observation sessions were conducted. Each one observer went into a class to observe one child who was selected randomly beforehand. In other words, among 20 or so children, there were only five of them who were being observed in each session. Subjects did not know they were being observed.

After setting up the video, a technician showed the transparencies by replacing one every 15 seconds. Indication of watching TV, or looking at the transparency, or doing other activities were marked by the observer every 15 seconds for each child for a 16 minute period.

After reviewing the video, a semi-structure in-depth interview was conducted individually to collect recall data.

Results

Children's TV viewing attention was observed by the researcher and observers on a one-to-one basis. Figure 2 presents the percentage of children who focused on the TV screen at each moment of observation. It is noted that the visual contact with TV during the 19th to 21st period was about 50%, compared with other periods such as the 33rd to 38th, whose contact rate was higher than 98%. The variation of TV attention of children throughout the period of video viewing could be visualized when the percentage figures were computed and transformed into a chart. As shown in Figure 3, some time periods attracted more attention than the others.

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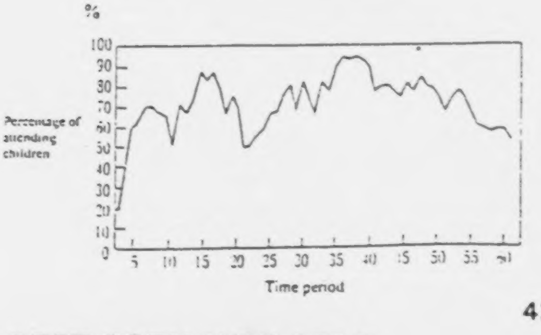
Figure 2

Percentage of TV Attending of Children

Time period	n	%
1	21	35.0
2	35	58.3
3	37	61.7
4	42	70.0
5	42	70.0
6	40	66.7
7	39	65.0
8	30	50.0
9	43	71.7
10	40	66.7
11	45	75.0
12	53	88.3
13	50	83.3
14	53	88.3
15	48	80.0
16	40	66.7
17	46	76.7
18	42	70.0
19	30	50.0
20	31	51.7
21	34	56.7
22	36	60.0
23	41	68.3
24	42	70.0
25	47	78.3
26	50	83.3
27	42	70.0
28	51	85.0
29	46	76.7
30	41	68.3

Figure 3

TV Attention of Children in the Observation Period



It should be noted that gender difference was not found; however, age difference was discovered in the amount of visual contact of TV. Figure 4 offers an interpretation of age difference during the observant period. The average time focusing on TV for the 6-year-old children was 11.98 minutes, and 10.23 minutes for the 5-year-olds respectively (t = 2.25 *). Significantly, 6-year-olds are more capable of holding their attention than 5-year-olds in average. It is graphically demonstrated in Figure 5.

Figure 4

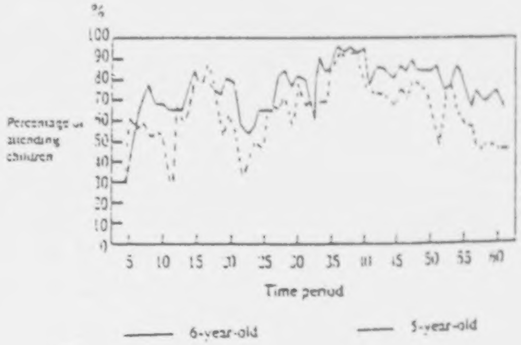
Mean Difference of Attending Time of Various Source Between Age Groups

Age Attention direction	6-year-old (N=30)	5-year-old (N=30)	T value
TV screen	M=11.98 SD= 2.91	M=10.23 SD=3.14	2.25 *
Transparency	M=1.90 SD=1.73	M=2.70 SD=2.07	-1.62
Other activity	M=1.12 SD=1.55	M=1.68 SD=1.66	-0.40

*P<0.05

Figure 5

Comparison of TV Attention of 5-year-old and 6-year-old Children



Attention gap between children from urban and rural area was statistically significant. T-test showed urban children were more attracted to TV than rural children were. In average, rural children spent 9.58 minutes in

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viewing video, while urban children spent 12.63 minute (t = -4.28 ***). By the same token, rural children spent more time on watching transparencies and doing other activities than urban children did (see Figure 6). Figure 7 also supports the above finding that children from urban area were more capable of holding attention toward video than their counterparts.

Figure 6

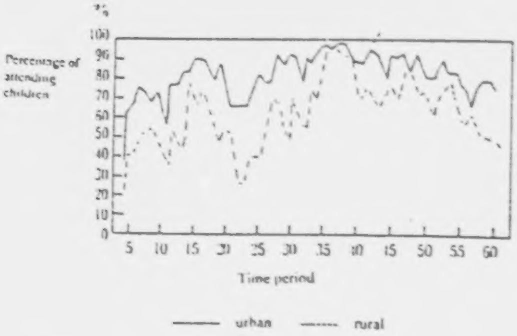
Mean Difference of Attending Time of Various Source Between Living Areas

Living area Attention direction	Rural (N=30)	Urban (N=30)	T value
TV screen	M=11.98 SD=2.91	M=12.63 SD=2.06	-4.28 ***
Transparency	M=3.15 SD=2.14	M=1.45 SD=1.25	3.76 ***
Other activity	M=2.27 SD=1.95	M=0.93 SD=1.12	3.27 **

P<0.05 ** P<0.01 *** P<0.001

Figure 7

Comparison of TV Attention of Urban and Rural Children



Two-way ANOVA was computed for further investigation of whether interaction exists in living area and age variable. As shown in Figure 8, no interaction was found between age and living area. Children from rural areas showed less interest in TV viewing regardless of their age.

Figure 8

Two-way ANOVA Table Summary

Source of variance	SS	DF	MS	F-ratio
Main effects	185.15	2	92.58	13.179***
Age	46.38	1	46.38	6.60*
Area	138.78	1	138.78	19.76***
Interaction	0.38	1	0.38	0.05
Variance explained	185.53	3	61.84	8.80***
Residuals	393.38	56	7.03	
Total	578.911	59	9.81	

* P<0.05 ** P<0.01 ***P<0.001

Qualitative data was collected from in-depth interviews to gather information regarding what and how children recall video content. Textual analysis was applied in order to determine what content or form might invite viewing attention. Based on the interview transcripts, recall were categorized into two dimensions: visual memory and audio memory, under which description of memory cue (reason why they remember certain content expressed by the subject) was recorded. Under visual memory, there were four items including character(man, woman, puppet, etc.), acting, and setting (props, dress, etc.) . Dialogue and effect were categorized as analyzing items of audio memory. In general, children remembered moving images better which were post-produced with special effects (such as slow motion), or segments with saturated visual in action. Such findings were supported by Figure 3, Figure 5, and Figure 7, statistically from previous discussion.

In addition, children had better memory of animal character over human character, and female character was better remembered than male character was. It seems that gender (or human being) identification has not yet developed for 5 and 6-year-old children. The researcher found that children in general were attracted by "moving visuals" or saturated visual codes, which usually accompanying by animation or special effects. On the contrary, talking heads or even dialogues between puppets were less powerful in inviting children's attention.

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Discussion

The findings indicate that when watching TV programs, the pre-school children were more attracted to visual segments with moving images than static ones. However, further investigation shows that significant differences exist in age, and urban and rural factors. Relatively speaking, younger children and rural children were less attracted by TV programs. Furthermore, data from in-depth interviews points out that much of the recall was related to the form which the information was encoded in a visualized way; that is using special effects or characters in action. Reasonable inference for the fact that rural children pay less attention to the video which may result in registering less information is due to language difficulty. Mandarin Chinese is the official language for most of children's programs in Taiwan. However, Taiwanese is one of the most popular dialects spoken for many children who live in rural areas. For rural audiences, language difficulty became one of the obstacles which affected their understanding of the content and their interest or attention would fall with the viewing process.

As far as the audio memory concerns, to the researcher surprise, sound effects did not seem to play an essential role of memory cue. It is even more evident particularly when visual code was dominating the information process. For example, in the video, 98% of children were attracted by the segment that one of the main characters was covered by a banana skin by using reverse special effects. At the time, very few children recalled special sound effects laid along with the visual action.

Conclusion and Implications

The study presented evidence regarding what children focus on and what and why they recall from viewing children's TV programs. The findings contribute to the body of knowledge of how children's attention differ by age group as well as living area. From a developmental psychological point of view, one year apart for the 5-year-old and 6-year-old may not show cognitive significant difference. However, from the result of the study, it is clear that older children have better attention span toward televised messages. Another possible explanation for this, is that the content of the program was more suitable for older children. In either case, the concept of age difference has narrower definition than what is being practiced now. This finding should help to enlighten TV children program producers to the fact that age difference needs to be redefined.

Similar to many other countries, in Taiwan, the production of children's program is usually nationwide. In other words, there is only one version that circulates throughout the entire island. However, the qualitative data in this study shows that if the language used in a program is different from the language used by the target audiences, a negative effect toward attention casting results. This issue has never been raised before to TV producers or the public. The study suggests that the language used in a program should be recognized as an important factor that affects children's attention span.

The ecology of the living area seems to have great impact on children's attention and interest. Children who are familiar with a rural environment demonstrate less attention span to the video containing content and format mainly from an urban atmosphere. It is evident that children are attracted to things and settings with which they can associate or identify.

In conclusion, the findings from the preliminary study raise cultural and ecological dimensions that affect audience's reception of TV messages. More efforts is needed to understand the holistic picture of children's TV viewing context—psychologically, socially, culturally, and ecologically.

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Perceptions Of Instructional Design Process Models

by Robert Maribe Branch

Abstract

Instructional design is a process that is creative, active, iterative and complex. However, many diagrams of instructional design are interpreted as stifling, passive, lock-step and simple because of the visual elements used to model the process. The purpose of this study was to understand how the instructional design process is perceived through diagrams composed of boxes and straight lines with arrows, and ovals and curved lines with arrows. While confusing, flowing and linear are used to describe both diagram types, organized and busy were mentioned only to describe the diagram composed of boxes and straight lines with arrows.

Introduction

Diagrams are the connection between an idea and the conveyance of a message. Designs depicting processes such as flow diagrams are usually sequential and involve a directional element. Plane geometric shapes, lines and pointing devices, such as arrows are three of the basic design elements found in diagrammatic communication. Perceptions and interpretations can be influenced by the designers' choice of visual elements, which should help show the relationships among those elements. The interpretations of each element represent a micro perspective which influences the understanding of the whole diagram. Flow diagrams which are commonly utilized to present the instructional design (ID) process "may be heavily influenced by the way in which ID models are visually depicted" (Rezabek & Cochenour, 1996, p. 299). Graphic elements which elicit viewer interpretations that are inconsistent with the original intent of the whole diagram diminish the fidelity between practice and the conceptual portrayal of that practice.

The purpose of this study was to determine if the expressed perceptions of the types of flow diagrams likely to be used to convey the instructional design process. Perceptions were elicited on three variations of a flow diagram conveying similar content; without any text. This current study seeks to advance the work of Rezabek and Cochenour (1996) about the "importance of the visual display of ID models for professionals teaching the instructional design process . . ." (p. 309). This study also extends the work of Branch and Bloom (1995) who contend instructional design professionals can improve the fidelity of the messages received by readers through better understanding of the use of visual elements in the portrayal of models, flow diagrams, processes and ideas. The foundation of this preliminary investigation is based on perceptions of the reader, variation in graphic element type and accurate interpretations of visualized process models.

Research Questions

Several assumptions guided the data collection and analysis of this study. The fundamental assumption was that visual displays promote viewer understanding, and therefore, the impact of perceptions of process models and the role of graphic elements in the accurate portrayal of instructional design influence the construction of knowledge about a defined practice. Perception is operationalized here to mean a relative concept based on personal interpretations of visual elements within an environment, our epistemology, the way we organize information to make meaning, and our cultural heritage. Perceptually, the meaning of a whole diagram depends on the relationship between its parts. Visual elements have a conceptual relationship based on their similarity, proximity and continuity. Thus, variations in the composition of graphic elements influence perception. The contention is that instructional design is process oriented, based on procedures [both *product* procedures and *process* procedures], iterative, involves concurrent actions and is best modeled by visual displays. The main research question is: do varieties of flow diagrams conveying similar content elicit similar adjectives?

Methodology

The participants were 31 graduate students at university in the Southeastern United States. Twenty-three females and eight males generated data for the study. Ten of the participants were under age 30, twelve were between the ages of 31 and 40, and eight participants were between the ages of 41 and 55 years old. Nineteen participants were masters students and twelve were doctoral students. While approximately half of the participants were majoring in the field of Instructional Technology, practically all were unfamiliar with the details of the instructional design process. Each participant was randomly assigned to one of three reader groups. Each reader group contained all three variations of the diagram; but presented in different orders. The reader group was determined by the order in which the participant read the three diagrams forms (Figure 1). The diagram forms were constructed on variations of straight line, arrow and plane geometric shape arrangements. Boxes, ovals and a mix of boxes and ovals formed the dominant characteristic of the diagrams each group was asked to read. The "Boxes" diagram is composed of rectangles and straight lines with arrows, the "Ovals" diagram is composed of ovals and curved lines with arrows and the "Mixed" diagram is composed of rectangles, ovals, and hybrids of the two. Figures 2, 3 and 4 contain the actual diagrams each participant was asked to read.

Data were collected at the beginning of the class. The participants were requested to write 3-5 adjectives within two minutes. This was repeated three times. Time on task lasted approximately 8-10 minutes. The person administering the diagram forms remained silent during the entire data collection. Each participant wrote about four words (mean = 3.77 words).

Figure 1

Reader Groups

Group	Diagram Order
"Boxes"	Boxes - Ovals - Mixed
"Ovals"	Ovals - Mixed - Boxes
"Mixed"	Mixed - Boxes - Ovals

Figure 2

"Boxes" diagram adapted from Dick and Carey (1996)

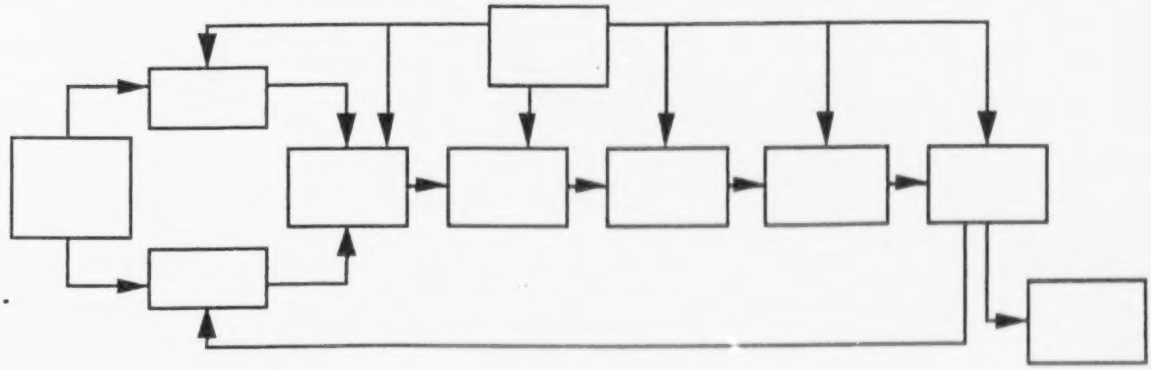


Figure 3

"Ovals" diagram

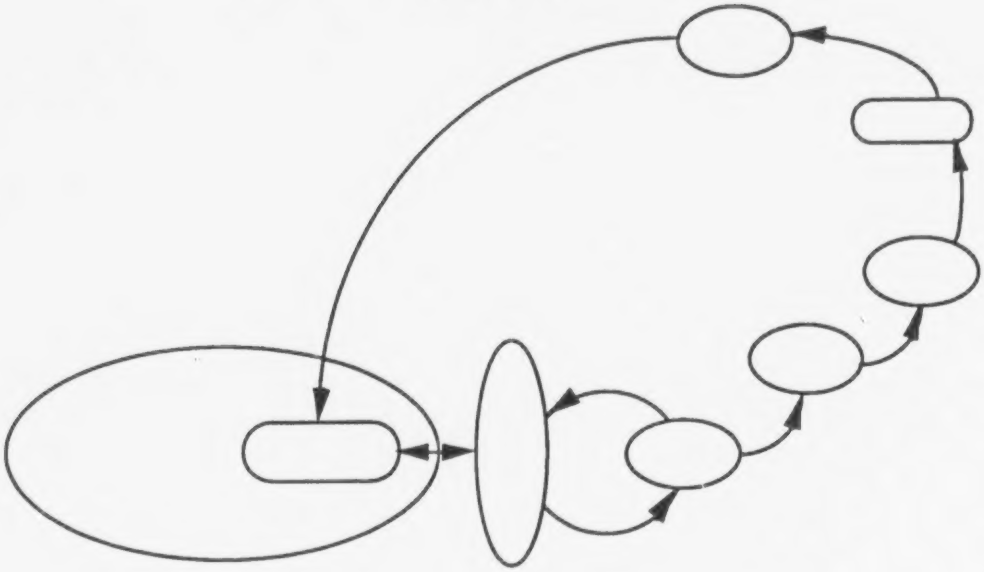
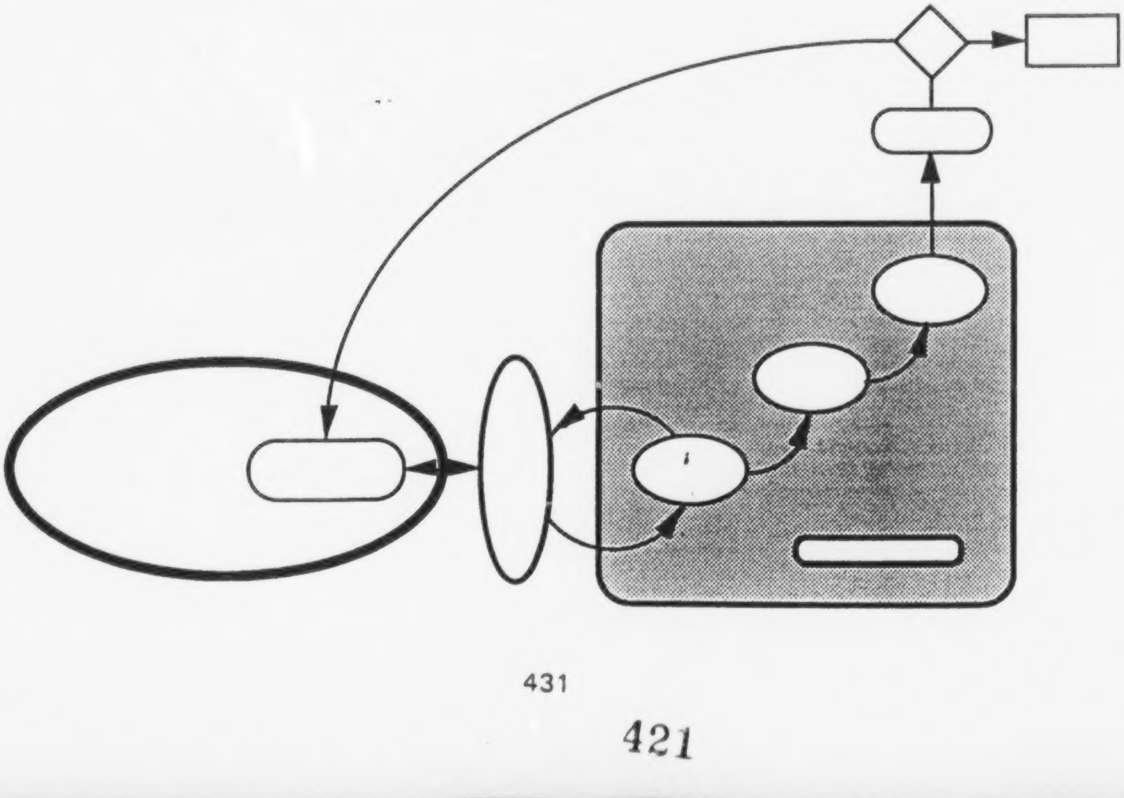


Figure 4

"Mixed" diagram adapted from Edmonds, Branch and Mukherjee (1994)



Results

Figure 5 summarizes the frequency of words used to describe each of the three different diagrams. Similarities, differences and combinations in interpretation emerged and were used as labels to organize the findings. The following observations are based on the author's perception of the data.

Similarities

1. ***Confusing*** was the most frequently written word used to describe the "Boxes" diagram and the "Mixed" diagram; and was the sixth most frequently written word to describe the "Ovals" diagram.
2. ***Flowing*** was the 2nd and 3rd most frequently written word describing the "Boxes" and "Mixed" diagrams respectively; while mentioned only once by those who read the "Ovals" diagram.
3. ***Linear*** was the 4th frequently mentioned word to describe both the "Boxes" and "Mixed" diagrams.

Differences

1. ***Organized*** was the third most written adjective used to describe the "Boxes" diagram, but not mentioned at all for either the "Ovals" or "Mixed" diagrams.
2. ***Busy*** was written several times to describe the "Boxes" diagram, but not written for either the "Ovals" or "Mixed" diagrams.
3. ***Rigid*** was written as frequently as busy to describe the "Boxes" diagram, but not written for either the "Ovals" or "Mixed" diagrams.
4. ***Circular*** was written most frequently to describe the "Ovals" diagram and not written at all for the "boxes" diagram and only once to describe the "Mixed" diagram; while linear was not written at all to describe the "Ovals" diagram.

Combinations

1. ***Systematic*** was written several times to describe the "Boxes" and "Ovals" diagrams, but not written to describe the "Mixed" diagram.
2. Words beginning with the letter c were used to describe 30% of the adjectives for the "Ovals" diagram and 35% of the adjectives for the "Mixed" diagram. Words such as circular, continuous, cyclical, confusing, closed, complicated, correctional, conceptual, clear, complex, complicated and computer related were written; while confusing, complex and computer programming were written to describe the "Boxes" diagram. No other letter formed the beginning of more than 15% of any of the other lists of adjectives.

Conclusion

Because the actual practice of instructional design can be confusing for those new to the process, flowing in terms of one activity leading to another and linear at a macro level, the general perceptions of the participants for this study were accurate. Organized [highly structured], busy and rigid as descriptions of the flow diagram composed of boxes and straight lines with arrows is consistent with some approaches to the systematic design of instruction, however, such views represent limited knowledge about the actual nature of the instructional design process. Circular aptly describes the fundamental concept of instructional design, thus, the readers contributed support for the contention that ID process models should be incorporate ovals and curved lines with arrows. The information from this study can assist educators understand how people read diagrams, particularly with regard to perceptions of process models.

People introducing the concept of instructional design may want to utilize a variety of process diagrams to communicate situations where multiple functions occur concurrently; and where certain sets of functions concur in relative sequence to the other sets. While the fundamental concept of the instructional design process can be represented with rectilinear models, the actual practice of instructional design is better represented with curvilinear models. Therefore, circular, continuous, complex and interconnected flow diagrams should be used to convey accurate portrayals of instructional design practice.

Figure 5

Frequency of Words Used to Describe Each Diagram

Boxes n=14 23 different adjectives		**Ovals** n=10 23 different adjectives		**Mixed** n=7 20 different adjectives	
confusing	7	circular	5	confusing	3
flowing	6	continuous	5	conceptual	2
organized	5	sequential	4	flowing	2
linear	4	cyclical	3	linear	2
systematic	4	interconnected	3	procedural	2
busy	3	confusing	2	appealing	
rigid	3	systematic	2	bottom-up	
interconnected	2	closed		circular	
boxy		complicated		clear	
complex		correctional		complex	
computer programming		discrete		complicated	
exploded		feedback		computer related	
design		flowing		dependent [interconnected]	
frame		multiple		empty	
geometric		oblong		ending and beginning	
graphical		odd		evaluative	
interesting		partitioned		informational	
jumble		process		lacking	
managerial		reactionary		logical	
model		reinforcing		unbalanced	
product oriented		rotating			
skeleton		variable			
square		versatile			

Subsequent research needs to be conducted to confirm the findings of this study and to further identify the visual elements; and their juxtaposition that best represents the instructional design process. Knowledge about how people perceive instructional design process models should assist educators choose ways to enhance learner achievement.

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The Electronic Presentation:
A Status Report Of International Use

Robert E. Griffin, Rune Pettersson, Ronald Johnson

Abstract

This paper is the second in a series of reports describing how electronic presentations are currently used by business people. The report surveys business people in the United States and Sweden to determine how they are using the medium. This research suggests the most popular electronic presentation is presented to an audience of less than 25 people, with a liquid crystal display and an overhead projector, using Microsoft PowerPoint software.

Introduction

This is the second in a series of reports undertaken by the authors to explain the complexities of the electronic presentation as it is used in business. As we stated in the earlier paper[1], lack of information, false information and rumor surround the electronic presentation. This state of affairs is understandable since the medium is new and people who use the medium are inexperienced at employing it for presentations. There is confusion about what can be accomplished with this new medium.

For the purpose of this study the electronic presentation was described as a presentation which consisted of:

- a computer (often a laptop design),
- presentation graphic software (i.e. PowerPoint, Harvard Graphics or Freelance),
- a projection device such as an overhead projector and a liquid crystal projector, video projector with computer connections, a large screen monitor or a computer only.

There are, of course, other definitions for the electronic presentation, however, this definition fits the majority of the presentations used in business today.

A Brief History Of Electronic Presentations

Growth of the electronic presentation used for business presentations has been extraordinary. The first true, but crude, electronic presentations began with the simultaneous introduction of presentation graphics software and liquid crystal display panels used with overhead projectors. This development began in the mid 1980's. From that point on growth has exceeded almost everybody's expectations.

Not since the growth of the overhead projector in the 1960's has a family of audio visual devices so completely captured the attention of people who make presentations. But there are differences in the growth patterns of the two mediums. When the overhead projector exploded on the scene its impact was felt strongly by educational institutions, primary and secondary schools and colleges. While educational institutions have shared in the growth of electronic presentations, the high costs involved are often too much of a burden for educational institutions. This medium has had it's biggest impact to date in business; business people are making electronic presentations.

How The Study Was Conducted

A questionnaire was mailed to 506 business people in the United States and to 80 business people in Sweden. In the United States the subjects were randomly selected from the mailing list of the Private Industry Council of Central Pennsylvania, a training and development consortium located in State College, Pennsylvania.. This consortium provides guidance to businesses in the Central Pennsylvania region.

The Swedish data was sent to a random sample available to Dr. Pettersson in Sweden All of the subjects contacted were somehow associated with the business community.

A total of 277 questionnaires were returned by the due date stated on the questionnaire. In the United States, 201 questionnaires were returned. In Sweden, 76 questionnaires were returned.

The United States return rate was 40%. The Swedish return rate was 95%. A complete listing of the questions and outcomes of the study are shown in Appendix A at the end of this paper.

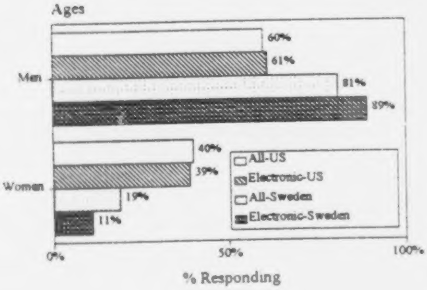
Results Of The Study

Many observations can be made from this study. What is interesting is that most of the results derived from the United States audience parallel the results of the Swedish subjects. There are eight results which stand out from the data collected.

Result 1-Gender Use Of The Medium

It is apparent that, in general, more men than women give business presentations (both electronic and non electronic). When we look at electronic presentations only, men give more electronic presentations than women both in the United States and in Sweden. This data is shown in Figure 1.

Figure 1
GENDER OF PEOPLE GIVING
ELECTRONIC PRESENTATIONS



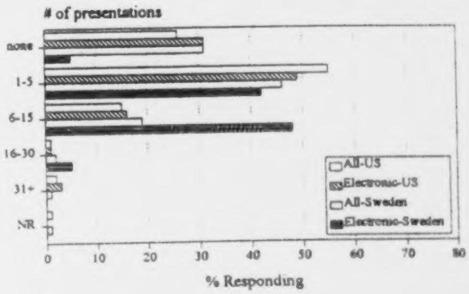
The reasons for the heavy use of electronic presentations by males and the lack of use by females may have something to do with computer use in general. The lack of computer use by females has been well documented. The newspaper USA Today recently discussed computer use among women. They substantiated the lack of female computer scientists in a feature story about computer anxieties.[2]

The data from this study supports the difference between men and women using electronic presentations. The difference between genders is most dramatic in the Swedish data. The difference is less significant in the United States.

Result 2-Frequency Of Use

One of the questions asked in the survey was "How many presentations do you normally give a month? The question did not ask the participants to differentiate between electronic and non electronic presentations. This data is shown in Figure 2.

Figure 2
AVERAGE NUMBER OF
PRESENTATIONS GIVEN PER MONTH



The most common response was 1 to 5 presentations per month in both the United States and Sweden, however, there is an interesting twist that appears in both sets of data. Presenters that give 6 or more presentations per month clearly prefer electronic presentations. If you focus on presenters who say they give 6 to 15 presentations per month, the percentage of people who rely on electronic presentations increases. It can be said from the data that if you must make a lot of business presentations, electronic presentations are the medium for you!

Result 3-Age Of Electronic Presenters

When we look at the data which combines electronic presentations and age, we see some interesting and difficult to explain results. This data is shown in Figure 3.

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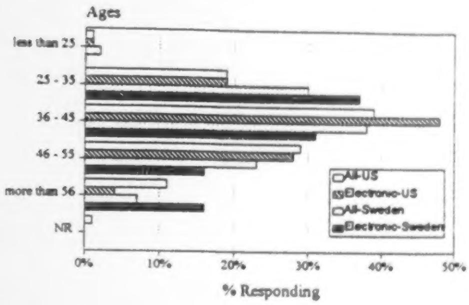
Figure 3
AGE OF PEOPLE GIVING ELECTRONIC PRESENTATIONS



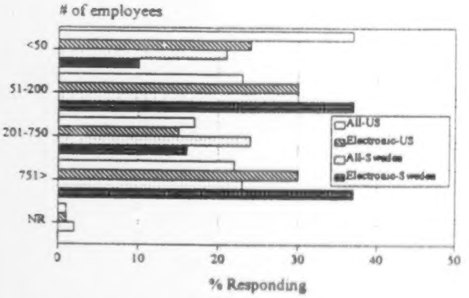
Major users of electronic presentations in the United States are the 36-45 age group while Swedish users are younger, in the 25-35 age group.

You should also focus attention to the Swedish data spike that appears with presenters over the age of 56. Older presenters in Sweden seem to rely heavily on electronic presentations. Why this spike appears can not be explained with the available data.

Result 4-Size Of Companies Using The Medium

Figure 4 correlates company size and the use of electronic presentations.

Figure 4
COMPANY SIZE



Both the United States and Swedish data show that electronic presentations are most heavily used in medium sized companies (51-200 employees) and very large companies (over 751 employees). Why this phenomenon occurs is difficult to explain.

While the study did not produce data to explain this circumstance the author's speculate that electronic presentations are used by large companies because they can afford the price of the necessary presentation equipment. A simple laptop computer and a data/video projector can cost about $8000.00 (U.S.). Larger companies have the budgets to provide the equipment and guidance to encourage presenters to use electronic presentations.

Why medium sized companies are heavy users of electronic presentations is more difficult to resolve. The fact that this result shows in both the United States and Swedish data indicates it is not a mistake. This result is probably explained because medium sized companies do not have the resources or time to create and produce the more conventional presentational aids, overhead transparencies and 2x2 slides, hence these companies are forced to rely on electronic presentations. Most medium sized companies have very little discretionary income and are therefore forced to make the best use of limited time and money.

Result 5-Why Use Electronic Presentations?

One of the major questions the authors had hoped to answer with this data was why people use electronic presentations. What drove presenters to choose the electronic presentation medium rather than flip charts, 2x2 slides or overhead transparencies?

One general theme came from the open ended comments requested on the survey. Many people chose the medium because they viewed it as a new, modern, progressive medium. Presenters that used the medium often reported using it because they felt their audiences were impressed by the technical nature of the medium. None of these affective responses given by the subjects could be verified by other data in the survey.

One reason for relying on the medium, and probably any audio visual medium, was because the subjects used visuals as a part of their presentations. This data is shown in Figure 5.

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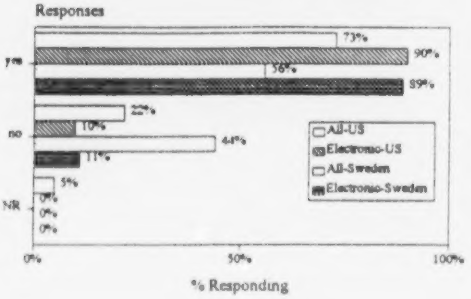
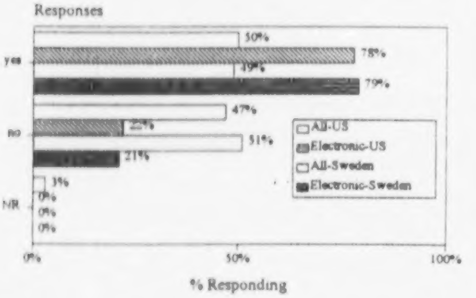
Figure 5
DO YOU NORMALLY USE VISUALS IN YOUR PRESENTATIONS?



The data shown in Figure 5 states the obvious, presenters use an audio visual medium because they have visuals to show their audience. Swedish presenters appear to turn to the electronic presentation a bit more frequently than their United States counterparts when making this decision. Little else needs to be said about this data.

Figure 6 indicates the single most significant reason discovered by the authors for giving electronic presentations.

Figure 6
DO YOU HAVE ACCESS TO A LAPTOP COMPUTER?



The data indicates if you own a laptop computer you are likely to make electronic presentations. The data does not provide exact reasons why laptop owners give electronic presentations. We can only guess why laptop users use electronic presentations.

It may be that laptop owners have learned the power that presentation graphics software affords. Or laptop computer users may simply be familiar enough with computers to feel comfortable with the medium. It may also be that laptop computer users may make electronic presentations to help justify the expenditure for their laptop computers. Whatever the reason, owning or having access to a laptop computer increases the possibility that the owner or user will give electronic presentations.

Result 6-How The Medium Is Used

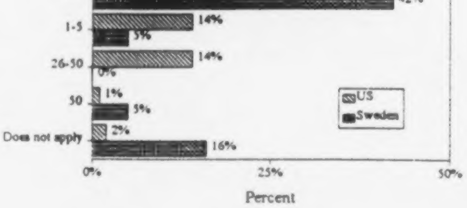
Result 6 encompasses the results of four of the questions in the survey (questions 6, 8, 9 and 10). The results differ slightly between the United States and Swedish audiences, but the differences are only slight. The *typical* electronic presentation is:

- presented to an audience of less than 25 people,
- uses a liquid crystal display and overhead projector,
- created using Microsoft PowerPoint software,
- and presented using a formal style of delivery.

The data supporting these points is shown in Appendix A.

Interestingly, these four profiles of the electronic presentation cited above are constant in both the United States and Sweden. The only subtle variation in the data between the United States and Swedish is shown in Figure 7.

Figure 7
TO WHAT SIZE AUDIENCE DO YOU NORMALLY PRESENT ELECTRONIC PRESENTATIONS?



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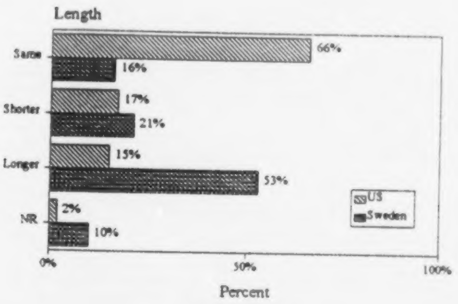
The typical audience for an electronic presentation in the United States is 11-25 people while the typical Swedish audience is 6-10 people. This is an insignificant difference, but the data marks an important distinction. What is important here is that electronic presentations are given to small audiences even though the electronic presentation is capable of presenting to auditorium sized audiences. This medium, which is powerful enough technologically to present to the masses, has currently found a home with smaller audiences. It is difficult to explain why this technology is considered useful for small audiences. Most likely time will move the technology to larger audiences.

Result 7-Length Of Presentation

Another important assessment is the effect the medium has on the message. In seeking this data the authors were trying to determine if electronic presentations resulted in presentations that were longer, shorter or equal to similar presentations given with more conventional media. The results are shown in Figure 8.

Figure 8
IF AT TIMES YOU GIVE ELECTRONIC PRESENTATIONS & AT OTHER TIMES YOU USE ANOTHER MEDIUM, ARE YOUR PRESENTATIONS...



Most electronic presenters in the United States reported that the electronic medium did not effect the length of their presentations. The number of electronic presenters in the United States who reported longer or shorter presentations was insignificant.

However, Sweden presented a different picture. The majority of electronic presenters in Sweden reported their electronic presentations were longer than non-electronic presentations. What is interesting is that we also see a somewhat smaller group within the Swedish subjects that comment their electronic presentations are shorter. More investigation is needed in this area.

Result 8-Media Preference

One of the very interesting findings of the study concerned what medium business presenters preferred. Subjects were asked to rank the four major business media (overhead transparencies, 2x2 slides, flip charts and electronic presentations) based on their perceived usefulness as a presentation medium. Because the focus of this study was on electronic presentations, the reader would assume that this medium was a solid favorite among all presenters. The findings are shown in Figure 9.

What is interesting about the data is that the overhead projector continues to be the medium of choice for most presenters. .The only subjects that deviated from this norm were the Swedish users of electronic presentations. Even though many people reported a strong preference for the electronic presentation, it seems that the overhead projector is the medium that most people will use if they are unsure of the speaking situation. Reliance on the overhead projector is not difficult to understand. The simplicity of the overhead projector presentation is legendary. Armed with an overhead projector, projection screen and some overhead transparencies a presenter can give a first class presentation meeting the expectations of any audience. Further, every hotel or conference center can easily have this equipment ready for use at a moments notice. When you must give a difficult presentation you do not want to worry about how the visuals will be projected.

It is clear from the data that many presenters do not think that gathering the tools for an electronic presentation is easy. Many subjects in the study reported that they used electronic

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Figure 9
MEDIA PREFERENCE RANKINGS

Rank	All Respondents-U.S.	Electronic Presenters-U.S.	All Respondents-Sweden	Electronic Presenters-Sweden
1	Overhead projector	Overhead projector	Overhead projector	Electronic
2	Flip chart	Electronic	2x2 slides	Overhead projector
3	Electronic	Flip chart	Electronic	Flip chart
4	2x2 slides	2x2 slides	Flip chart	2x2 slide

presentations when they were presenting at their home base, but would never use the medium "on the road". Several users of electronic presentations reported carrying all of the necessary equipment to make an electronic presentation if they were traveling. Even with these precautions, travelers commented they would never leave home without a backup set of overhead transparencies. The overhead projector will be king for some time to come.

Implications

It is difficult to determine implications from this study because the project was conducted to determine what is, to establish a current state of affairs. We never intended to use the data to see into the future. However, as we investigated the data some glimpses of the future were obvious. The authors' collective insights propose the following implications:

Implication 1

As engineers envision the electronic display device of the future, we suggest they follow the model presented by the overhead projector: affordable, maintenance free, ubiquitous and simple to use. To entice the next generation of business users to the electronic medium, electronic display devices will have to be:

- self contained (suggesting that projectors will out sell LCD displays and overhead projector combinations),
- be bright enough to use with the room lights on,
- simply be projection devices, not all-in-one audio visual tools (business people require very few features, even remote controls can confuse many users),
- have replaceable projection lamps or lamps that "burn down" rather than burn out or make use of dual-replaceable projection lamps,
- be either portable (so presenters can easily carry it) or available in all hotels and conference centers (inexpensive so they will buy many of them),
- permit "idiot proof " connections between the computer and the display device.

Technological advances should allow many electronic designers to meet these seemingly impossible goals.

Implication 2

Older presenters and women may need extra coaching to begin using electronic presentations for business presentations. To use the jargon of marketers, these groups appear to be "late adopters" in the electronic presentation revolution. Corporate management and trainers will be well served by working with this segment of the work force.

Implication 3

Presentation graphics software is now dominated by one manufacturer, Microsoft. Microsoft has grown to dominate presentation graphics technology with its PowerPoint software so dramatically that very few users rely on any other software.(United States-52% use PowerPoint, Sweden-37% use PowerPoint, the other presentation graphics software accounts for the remainder). Because of the dominance that Microsoft exerts on the industry, if improvements are needed in presentation graphics technology, Microsoft will have to do it. Presenters will have to exert pressure on the company in order to have changes and additions to the software. Change will become difficult as PowerPoint achieves monopoly status.

Summary

The electronic presentation is an important medium for business people to understand and know how to use.

As presenters, we are witnessing the birth of a new medium. Years from now we will find it hard to believe that we carried page sized pieces of plastic printed with colored inks with us to presentations, or that we had to darken a room to make a presentation. We may even find that our current form of the electronic presentation is antiquated. The electronic presentation is just beginning to dominate the presentations.

[1] Griffin, Robert E. "Electronic Presentations: How Are They Being Used In Presentations" **Eyes On The Future: Converging Images, Idesa and Instruction** Ed by Robert E. Griffin Et al. Blacksburg, VA: 1996. 409-417.

[2] "How girls get scared away from computers", **USA Today**, June 26, 1996, page D-1.

Appendix A
COMPLETE QUESTIONNAIRE RESULTS

QUESTION	POSSIBLE RESPONSE	ALL RESPONDENTS-U.S. (N=201)	ELECTRONIC PRESENTERS-U.S. (N=54)	ALL RESPONDENTS-SWEDEN (N=57)	ELECTRONIC PRESENTERS-SWEDEN (N=19)
1. On average, how many presentations (electronic & non-electronic) do you normally give a month?	None	52	23	18	1
	1-5	111	36	26	8
	6-15	31	12	11	9
	16-30	2	1	1	1
	31+	4	2	1	0
	NR	1	0	0	0
2. Do you usually use visuals in your presentation?	Yes	147	44	37	17
	No	44	5	29	2
	NR	10	0	0	0
3. Have you ever given an electronic presentation?	Yes	54	-	19	19
	No	139	-	37	0
	NR	8	-	1	0
4. Of the presentations you give each month, how many are given electronically?	None	139	0	1	1
	1	0	19	5	5
	2-5	0	16	9	9
	6-10	0	4	3	3
	10+	0	4	1	1
	NR	8	1	0	0
5. When you use an electronic presentation what are the reasons that you choose to use them?	open response				
6. To what size audience do you normally present electronic presentations?	1-5 people	-	7	-	1
	6-10	-	13	-	8
	11-25	-	24	-	6
	26-50	-	7	-	0
	50+	-	1	-	1
	Does not apply	-	2	-	0
7. If you at times give electronic presentations & at other times use another medium, are the electronic presentations...	longer	-	8	-	3
	shorter	-	9	-	4
	about the same	-	36	-	10
	NR	-	1	-	2
8. For what kind of presentation would you use an electronic presentation?	formal	-	34	-	12
	informal	-	5	-	1
	equally good	-	15	-	2
	NR	-	0	-	4

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QUESTION	POSSIBLE RESPONSE	ALL RESPONDENTS-U.S. (N=201)	ELECTRONIC PRESENTERS-U.S. (N=54)	ALL RESPONDENTS-SWEDEN (N=57)	ELECTRONIC PRESENTERS-SWEDEN (N=19)
9. When you use electronic presentations, what software do you normally use to create & present you presentation?	PowerPoint	-	28	-	7
	Harvard	-	6	-	0
	Graphics	-	5	-	4
	Freelance	-	3	-	3
	Persuasion	-	12	-	4
	Other	-	0	-	1
	NR				
10. When you use electronic presentations, what type of display do you most commonly use?	video monitor	-	15	-	2
	liquid crystal	-	29	-	1
	display	-	4	-	12
	video projector	-	3	-	0
	other	-	3	-	4
	NR				
11. Do you own or have access to a laptop computer?	yes	101	42	28	15
	no	95	12	29	4
	NR	5	0	0	0
12. Rank the mediums in terms of their usefulness to you in business presentations.	see paper				
13. What is the size of the company you work for?	<50 employees	73	13	12	2
	50-200	46	16	17	7
	201-750	34	8	14	3
	>751	45	16	13	7
	NR	3	1	1	0
14. What business sector do you work in?	Multiple responses				
15. What is your gender?	male	120	33	46	17
	female	80	21	11	2
	NR	1	0	0	0
16. What is your age?	<25	3	1	1	0
	25-35	38	10	17	7
	36-45	78	26	22	6
	46-55	59	15	13	3
	>56	22	2	3	3
	NR	1	0	1	0

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